

ARITHMETICK
MADE EASIE,

According to the NEW METHOD
Now Taught and Practis'd in

L O N D O N.

W H E R E I N

The RULES of that Necessary ART
are briefly Explained, and Illustrated
with such familiar EXAMPLES as
may suit the meanest Capacity, if
they desire to learn it.

To which is added
Succinct Treatise of *Decimal Fractions*,
with Compleat TABLES, RULES,
and EXAMPLES demonstrating
the same. The like not Extant in any
other TREATISE of this Nature.

By JOHN COPELAND,
Writing-Master.

The Second Edition.

L O N D O N :

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in Lombard-street, near Stocks-Market. 1714.

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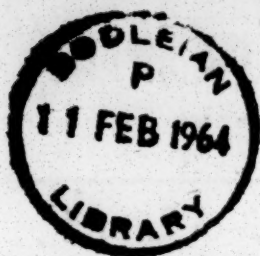
To the Worshipful
Sir Francis Child, Knt.
PRESIDENT,

The Worshipful
Thomas Lockington, Esq;
TREASURER,

And the rest of the Worshipful the
GOVERNORS
OF
Christ's Hospital, London.

This MANUEL of
Practical Arithmetick

Is most Humbly Dedicated
By Your Worships most Obedient,
and most Humble Servant,



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ADVERTISEMENT.

WRITING and ARITHMETICK are carefully taught by the Author, at the Hand and Pen in New-Street, in Shoe-Lane, near Fleet-Street, London.



ARITHMETIC

Made Easie.

CHAP. I.

Concerning Numbers, with a Table of NUMERATION.



NUMERATION is the First Part of Arithmetick which shews how to express or pronounce the true Value of any Number by Ten Figures or Characters, of which the last is called a *Cypher*, and of it self signifieth nothing; but being added to the Right hand of any other Figure increaseth the Value: Which Figures are as follow,

viz.

One, Two, Three, Four, Five, Six, Seven, Eight, Nine, Cypher.

1, 2, 3, 4, 5, 6, 7, 8, 9, c.

1st. The nine first are significant Figures, any one of these Figures is called a *Single Number*, as 3, 5, 8; but being joined with any other Figure, as 68, 76, is called a *Double or Compound Number*.

B

Note,

Of Numeration.

That in any Number there are so many Places as there are Figures.

The Order of the Places is from the Right Hand to the Left; so the outermost Figure towards the Right Hand is the first Place, and the outermost towards the Left Hand is the ninth or last Place.

The Places proceed in a ten fold Proportion: the first Place is the Place of *Units*, wherein a Figure shews its own single Value; the second is the Place of *Tens*, wherein a Figure signifieth ten times its own single Value; the third Place is *Hundreds*, wherein a Figure signifieth an hundred times its own single Value; the fourth is the Place of *Thousands*, wherein any Figure signifieth a thousand times its own single Value; the fifth is the Place of *Ten thousand*, wherein any Figure signifieth ten thousand times its own single Value; the sixth is the Place of *Hundred thousand*, wherein any Figure signifieth a hundred thousand times its own single Value; the seventh is the Place of *Millions*, wherein any Figure signifieth a million of times its own single Value; the eighth is the Place of *Ten millions*, wherein any Figure signifieth ten million of times its own single Value; the ninth or last Place is the Place of *Hundreds of millions*, wherein any Figure signifieth an hundred of millions of times its own single Value.

And so you may express the first Line of Figures in the following Table:

One Hundred Twenty Three Million, Four Hundred Fifty Six Thousand, Seven Hundred Eighty Nine.

The Line of Six's you may read thus:

Six Hundred Sixty Six Million, Six Hundred Sixty Six Thousand, Six Hundred Sixty Six.

Suppose you ask the Question, What's Five in the Fifth Place by annexing Four Cyphers towards the Right Hand of the Five, thus 50000? It is Fifty Thousand. Observe the Table.

Numeration Table.

Hundreds of Millions			Hundreds of Thousands			Hundreds		
Tens	Millions		Tens	Thousands		Tens	Units	
1	2	3	4	5	6	7	8	9
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9
9	8	7	6	5	4	3	2	1
9	8		7	6	5	4	3	2
9		9	8	7	6	5	4	3
			9	8	7	6	5	4
				9	8	7	6	5
					9	8	7	6
						9	8	7
							9	8
								9
Ninth Place	Eighth Place	Seventh Place	Sixth Place	Fifth Place	Fourth Place	Third Place	Second Place	First Place

Note, Although I have made the Table to consist but of nine Places, yet it may consist of as many Places as you please, observing that the Value of every Place is ten times as much as that which goeth before it : So the Tenth Place is *Thousands of Millions*, the Eleventh Place is *Tens of Thousands of Millions*, the Twelfth Place is *Hundreds of Thousands of Millions*, the Thirteenth Place is *Millions of Millions*, the Fourteenth Place is *Ten Millions of Millions*, the Fifteenth Place is *Hundred Million of Millions*, &c.

So that Fifteen Figures may be read as followeth, viz.

<i>Hundred Million of Millions</i>			<i>Hundred Thousand of Millions</i>			<i>Hundreds of Millions</i>			<i>Hundreds of Thousands</i>			<i>Hundreds</i>		
<i>Ten Million of Millions</i>			<i>Ten Thousand of Millions</i>			<i>Tens of Millions</i>			<i>Tens of Thousands</i>			<i>Tens</i>		
<i>Million of Millions</i>			<i>Thousand Millions</i>			<i>Millions</i>			<i>Thousands</i>			<i>Units</i>		
5	4	6	8	7	9	6	4	3	2	0	7	8	5	4

Five Hundred Forty Six Million of Millions, Eight Hundred Seventy Nine Thousand Six Hundred Forty Three Millions, Two Hundred Seven Thousand, Eight Hundred Fifty Four.

By the Help of the foregoing Table, and the Directions already given, you may express, value, or write down any Number.

C H A P. II.

*Addition of Money, Weight and Measure,
with their several Tables.*

ADDITION teacheth you to add Two or more Sums together, to make them one total Sum.

Note, $\left\{ \begin{array}{l} 4 \text{ Farthings} \\ 12 \text{ Pence} \\ 20 \text{ Shillings} \end{array} \right\}$ is $\left\{ \begin{array}{l} 1 \text{ Penny} \\ 1 \text{ Shilling} \\ 1 \text{ Pound} \end{array} \right\}$

Before you proceed these following Tables ought to be learned very well by heart.

s.	is	d.
1	is	12
2		24
3		36
4		48
5		60
6		72
7		84
8		96
9		108
10		120
11		132
12		144

d.	is	s.	d.
20	is	1	8
30		2	6
40		3	4
50		4	2
60		5	0
70		5	10
80		6	8
90		7	6
100		8	4
110		9	2
120		10	0

Of Addition

$$\begin{array}{r}
 l. \\
 4 \ 8 \ 9 \ 3 \\
 6 \ 8 \ 7 \ 4 \\
 9 \ 8 \ 7 \ 6 \\
 5 \ 7 \ 4 \ 6 \\
 4 \ 5 \ 7 \ 6 \\
 \hline
 \hline
 \end{array}$$

Total 3 1 9 6 5

If the Numbers to be added are of divers Names, as *Pounds*, *Shillings*, *Pence* and *Farthings*, then write them down so as Numbers of one Name may stand orderly under one another, and set the least Name next the Right Hand: but I would desire you to mind in all Additions and Subtractions the Title of your Account, as

- l.* stands for *Pounds*
- s.* stands for *Shillings*
- d.* stands for *Pence*

And when you would set down *Three Farthings*, a *Half-penny*, or a *Farthing*, write them thus,

$\frac{3}{4}$ *Three Farthings*
 $\frac{1}{2}$ *A Half-penny*
 $\frac{1}{4}$ *A Farthing*

as in the following Example.

A Man is indebted to the following Persons, viz.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
To { <i>A</i> —	476	16	11 $\frac{1}{2}$
{ <i>B</i> —	594	17	10 $\frac{3}{4}$
{ <i>C</i> —	687	19	11 $\frac{1}{4}$
{ <i>D</i> —	367	16	10 $\frac{1}{2}$
{ <i>E</i> —	498	18	11 $\frac{3}{4}$

B 4

Then

Then mind the Title of your Account, and see how many of the lesser Names makes one of the next greater; then begin with the least Name and add them together, saying, $\frac{3}{4}$ and $\frac{1}{2}$ is 5, and $\frac{1}{4}$ is 6, and $\frac{3}{4}$ is 9, and $\frac{1}{2}$ is 11 Farthings, which is 2 Pence 3 Farthings, which 3 Farthings I set down under the Line, and under the Name of Farthings, and carry 2 Pence to the next Name of Pence, saying, 2 that I carry and 11 is 13, and 10 is 23, and 11 is 34, and 10 is 44, and 11 is 55; now 55 Pence is 4 Shillings and 7 Pence, which 7 Pence I set under the Line, and carry 4 Shillings to the Name of Shillings, saying, 4 that I carry and 18 is 22, and 16 is 38, and 19 is 57, and 17 is 74, and 16 is 90 Shillings; which is 4 Pound 10 Shillings, which 10 Shillings I set under the Line and under the Name of Shillings, and carry 4 Pound to the Name of Pound, saying, 4 that I carry and 8 is 12, and 7 is 19, and 7 is 26, and 4 is 30, and 6 is 36; which 6 I set down under the Line, and carry 3 to the next, saying, 3 that I carry and 9 is 12, and 6 is 18, and 8 is 26, and 9 is 35, and 7 is 42; which 2 I set under the Line, and carry 4 to the next, saying, 4 that I carry and 4 is 8, and 3 is 11, and 6 is 17, and 5 is 22, and 4 is 26; which I put under the Line: The whole Work is finish'd, and I find the Sum of the given Numbers to be, Two thousand six hundred twenty six Pound Ten Shillings and Seven Pence Three Farthings, as by the following Work appeareth, viz.

<i>l.</i>	<i>s.</i>	<i>d.</i>	
476	16	11	$\frac{1}{2}$
594	17	10	$\frac{4}{4}$
687	19	11	$\frac{1}{4}$
367	16	10	$\frac{1}{2}$
498	18	11	$\frac{3}{4}$
Total 2626	10	07	$\frac{3}{4}$

To

Of Addition.

9

To Prove Addition.

Cut off with your Pen the first Line in your Addition, then add up all the other Lines again : *Lastly*, to the last Sum add the Line cut off, and if the Sum be equal to the Sum first added up, the Work is right ; but if unequal, the Work is false.

E X A M P L E S.

<i>l.</i>	<i>s.</i>	<i>d.</i>		<i>l.</i>	<i>s.</i>	<i>d.</i>	
476	16	11	$\frac{1}{2}$	784	18	10	$\frac{3}{4}$
594	17	10	$\frac{3}{4}$	669	19	11	$\frac{1}{2}$
687	19	11	$\frac{1}{4}$	476	18	10	$\frac{1}{4}$
367	16	10	$\frac{1}{2}$	768	19	11	$\frac{1}{2}$
498	18	11	$\frac{3}{4}$	468	16	10	$\frac{1}{4}$
2626	10	07	$\frac{3}{4}$	3169	14	06	$\frac{1}{4}$
2149	13	08	$\frac{1}{4}$	2384	15	07	$\frac{1}{2}$
2626	10	07	$\frac{3}{4}$	3169	14	06	$\frac{1}{4}$

Averdupoize Weight.

Note that { 16 Drams } is { 1 Ounce
 { 16 Ounces } { 1 Pound
 { 28 Pound } { 1 Quarter of 112 lb
 { 4 Quarters } { 1 Hundred Weight.
 { 20 Hundred } { 1 Tun

In a Tun are { 573440 Drams
 { 35840 Ounces
 { 2240 Pounds
 { 80 Quarters
 { 20 Hundred Weight of 112 lb each.

B 5

Note

Of Addition.

Note that the Marks

For $\left\{ \begin{array}{l} \text{Tuns} \\ \text{Hundreds} \\ \text{Quarters} \\ \text{Pounds} \\ \text{Ounces} \\ \text{Drams} \end{array} \right\}$ is $\left\{ \begin{array}{l} \text{T.} \\ \text{C.} \\ \text{Qr.} \\ \text{lb.} \\ \text{Oz.} \\ \text{dr.} \end{array} \right\}$

EXAMPLES.

T.	C.	Qr.	lb	oz.	dr.	T.	C.	Qr.	lb	oz.	dr.
84	10	1	16	14	10	46	14	3	16	11	10
96	17	3	18	15	11	84	19	2	24	14	15
17	18	2	13	11	10	69	16	3	18	10	11
68	16	3	17	13	14	49	15	2	19	11	11
76	19	2	18	11	10	68	14	1	17	10	08
345	03	2	02	03	07	320	01	2	13	11	07
260	13	0	13	04	13	273	06	2	24	15	13
345	03	2	02	03	07	320	01	2	13	11	07

Troy Weight.

Note that $\left\{ \begin{array}{l} 24 \text{ Grains} \\ 20 \text{ Penny-weight} \\ 12 \text{ Ounces} \end{array} \right\}$ is $\left\{ \begin{array}{l} 1 \text{ Penny-weight} \\ 1 \text{ Ounce} \\ 1 \text{ Pound} \end{array} \right\}$

In a Pound Troy are $\left\{ \begin{array}{l} 5760 \text{ Grains} \\ 240 \text{ Penny-weight} \\ 12 \text{ Ounces} \end{array} \right\}$

Note that the Marks

For $\left\{ \begin{array}{l} \text{Pounds} \\ \text{Ounces} \\ \text{Penny-weights} \\ \text{Grains} \end{array} \right\}$ is $\left\{ \begin{array}{l} \text{lb} \\ \text{oz.} \\ \text{pw.} \\ \text{gr.} \end{array} \right\}$

Of Addition.

II

lb	oz.	pw.	gr.
78	11	14	16
59	10	19	11
68	11	17	11
46	10	16	17

254 09 08 07

175 09 13 15

254 09 08 07

lb	oz.	pw.	gr.
87	11	16	17
48	10	17	18
58	11	18	17
49	10	16	10

245 09 09 14

157 09 12 21

245 09 09 14

Cloth Measure.

Note that 4 Nails }
is 1 Quarter. } 3 } Quarters is { 1 Yard
5 } { 1 Ell Flemish
5 } { 1 Ell English.

20 }
16 } Nails } is { 1 Ell English
12 } { 1 Yard
12 } { 1 Ell Flemish

Note that the Marks for { Yards } { yds.
Quarters } { qrs.
Nails } { na.
Ells Flemish } { El. fl.
Ells English } { Ells.

EXAMPLES.

Ells	qrs	na	yds	qrs	na	El. fl.	qrs	na
58	1	2	46	2	3	68	2	3
47	2	3	58	3	2	49	1	2
67	4	2	78	2	3	68	2	3
57	3	3	58	3	1	49	2	1
231	2	2	243	0	1	237	0	1
173	1	0	196	1	2	168	0	2
231	2	2	243	0	1	237	0	1

Wine

Wine Measure.

Note that $\left\{ \begin{array}{l} 2 \text{ Pints} \\ 2 \text{ Quarts} \\ 2 \text{ Pottles} \\ 42 \text{ Gallons} \\ 1 \text{ Tierce } \frac{1}{2} \\ 63 \text{ Gallons} \\ 2 \text{ Hogsheads} \\ 2 \text{ Pipes} \end{array} \right\}$ is $\left\{ \begin{array}{l} 1 \text{ Quart} \\ 1 \text{ Pottle} \\ 1 \text{ Gallon} \\ 1 \text{ Tierce} \\ 1 \text{ Hogshead} \\ 1 \text{ Hogshead} \\ 1 \text{ Pipe or Butt} \\ 1 \text{ Tun} \end{array} \right\}$

In a Tun are $\left\{ \begin{array}{l} 2016 \text{ Pints} \\ 1008 \text{ Quarts} \\ 504 \text{ Pottles} \\ 252 \text{ Gallons} \\ 6 \text{ Tierce} \\ 4 \text{ Hogsheads} \\ 2 \text{ Pipes} \end{array} \right\}$

Note that Honey and Oil are measured by this Measure.

EXAMPLES.

Tuns. hogs. gals. pot. qts. pts.

47 3 18 1 0 1

86 0 19 0 1 1

58 3 27 1 1 1

49 2 48 1 0 0

68 1 11 1 1 1

310 3 00 0 1 0

262 3 44 1 0 1

310 3 00 0 1 0

Tuns. hogs. gals. pot. qts. pts.

84 2 16 0 1 1

56 3 17 1 1 0

68 2 19 0 1 1

47 3 18 1 1 1

49 2 17 1 0 0

307 1 26 1 1 1

222 3 10 1 0 0

307 1 26 1 1 1

Beer

Beer Measure.

Note that { 2 Pints
2 Quarts
2 Pottles, or 282 } } is { 1 Quart
1 Pottle
1 Gallon
1 Firkin
1 Kilderkin
1 Barrel
9 Gallons
2 Firkins
2 Kilderkins }

In a Barrel are { 288 Pints
144 Quarts
72 Pottles
36 Gallons, or
10152 solid Inches
4 Firkins
2 Kilderkins.

Ale Measure.

Note that { 2 Points
2 Quarts
2 Pottles or 282 } } is { 1 Quart
1 Pottle
1 Gallon
1 Firkin
1 Kilderkin
1 Barrel
8 Gallons of Ale,
Herring or Soap } }
2 Firkins
2 Kilderkins }

In a Barrel are { 256 Pints
128 Quarts
64 Pottles
32 Gallons or
9024 Solid Inches
4 Firkins
2 Kilderkins.

Sheep's

Of Addition.

Sheep's-Wool Weight.

Note that	{	7 Pound	}	is	{	1 Clove
		2 Cloves				1 Stone
		2 Stone				1 Tod
		6 Tod $\frac{1}{2}$				1 Wey
		2 Wey				1 Sack
		12 Sacks				1 Laft.

In a Laft of Wool are	{	4368 Pounds
		624 Cloves
		312 Stone
		156 Tod
		24 Wey
		12 Sacks.

Of Dozens.

Note that $\left\{ \begin{array}{l} 12 \text{ Pieces or Things} \\ 12 \text{ Dozen} \\ 12 \text{ Small Grofs} \end{array} \right\}$ is $\left\{ \begin{array}{l} 1 \text{ Dozen} \\ 1 \text{ Small Grofs} \\ 1 \text{ Great Grofs.} \end{array} \right\}$

In a Great Grofs are $\left\{ \begin{array}{l} 1728 \text{ Pieces or Things} \\ 144 \text{ Dozen} \\ 12 \text{ Small Grofs.} \end{array} \right\}$

Square Measure.

Note that	{	16 Quarters of an Inch	}	is	{	1 Inch
		144 Inches				1 Foot
		9 Foot				1 Yard
		30 Yards $\frac{1}{2}$				1 Pole
		40 Pole long and 1 broad				1 Rood
		4 Roods				1 Acre
		640 Acres				1 Mile.

In a Square Mile are	{	4014489600 Inches
		27878400 Feet
		3097600 Yards
		102400 Poles
		2560 Roods
		640 Acres.

Apothe-

Apothecaries Weights.

Note that $\left\{ \begin{array}{l} 20 \text{ Grains} \\ 3 \text{ Scruples} \\ 8 \text{ Drams} \\ 12 \text{ Ounces} \end{array} \right\}$ is $\left\{ \begin{array}{l} 1 \text{ Scruple} \\ 1 \text{ Dram} \\ 1 \text{ Ounce} \\ 1 \text{ Pound} \end{array} \right\}$

In a Pound are $\left\{ \begin{array}{l} 5760 \text{ Grains} \\ 288 \text{ Scruples} \\ 96 \text{ Drams} \\ 12 \text{ Ounces} \end{array} \right\}$

Note that the Marks

For $\left\{ \begin{array}{l} \text{Pounds} \\ \text{Ounces} \\ \text{Drams} \\ \text{Scruples} \\ \text{Grains} \end{array} \right\}$ is $\left\{ \begin{array}{l} \text{lb} \\ \text{℥} \\ \text{ʒ} \\ \text{℥} \\ \text{gr.} \end{array} \right\}$

EXAMPLES.

lb	℥	ʒ	℥	gr.
78	11	6	2	18
46	10	5	1	17
68	11	4	2	16
49	10	3	1	17
244	08	5	0	08
165	08	6	0	10
244	08	5	0	08

lb	℥	ʒ	℥	gr.
54	10	5	1	12
69	11	6	2	16
87	10	3	2	19
46	11	6	1	16
259	08	7	0	03
204	10	1	1	11
259	08	7	0	03

Land

Land Measure.

Note that $\left\{ \begin{array}{l} 3 \text{ Barley Corns} \\ 12 \text{ Inches} \\ 3 \text{ Foot} \\ 2 \text{ Yards} \\ 5 \text{ Yards } \frac{1}{2} \\ 40 \text{ Poles} \\ 8 \text{ Furlongs} \end{array} \right\}$ is $\left\{ \begin{array}{l} 1 \text{ Inch} \\ 1 \text{ Foot} \\ 1 \text{ Yard} \\ 1 \text{ Fathom} \\ 1 \text{ Pole or Perch} \\ 1 \text{ Furlong} \\ 1 \text{ English Mile} \end{array} \right\}$

In a Mile are $\left\{ \begin{array}{l} 190080 \text{ Barley Corns} \\ 63360 \text{ Inches} \\ 5280 \text{ Feet} \\ 1760 \text{ Yards} \\ 320 \text{ Poles} \\ 8 \text{ Furlongs} \end{array} \right\}$

EXAMPLES.

Miles	Fur.	Pol.	Yds	Feet	Inch	Miles	Fur.	Pol.
568	7	17	746	2	11	687	0	28
869	6	16	589	1	06	596	5	16
768	5	34	764	2	10	689	6	17
496	4	19	879	1	11	768	5	19
2704	0	06	2981	0	02	2742	2	00
2135	0	29	2234	0	03	2055	1	12
2704	0	06	2981	0	02	2742	2	00

Dry Measure.

Note that	{	2 Points	}	is	{	1 Quart
		2 Quarts				1 Pottle
		2 Pottles				1 Gallon
		2 Gallons				1 Peck
		4 Pecks				1 Bushel of Corn Measure
		5 Pecks				1 Bushel of Water Meas.
		8 Bushels				1 Quarter
		4 Quarters				1 Chaldron
		5 Quarters				1 Wey
		2 Weys				1 Last

Note that 36 Bushels is a Chaldron of Sea Coal.

In a Last are	{	5120 Pints
		2560 Quarts
		1280 Pottles
		640 Gallons
		320 Pecks
		80 Bushels
		10 Quarters
		2 Weys.

EXAMPLES.

Chald. Qrs. Bush. Pec. Gal.

548 3 7 3 1

497 2 6 2 0

57 3 5 3 1

498 1 7 2 1

2133 0 3 3 1

1584 0 4 0 0

2133 0 3 3 1

Chald. Qrs. Bush. Pec. Gal.

687 2 6 1 1

498 3 7 0 0

694 1 5 1 1

786 3 7 0 0

2668 0 1 3 0

1980 1 3 1 1

2668 0 1 3 0

TIME.

T I M E.

Note that { 60 Seconds
60 Minutes
24 Hours
7 Days
4 Weeks
13 Months, 1 Day, 6 Hours } is { 1 Minute
1 Hour
1 Day
1 Week
1 Month
1 Year.

In a Year are { 31557600 Seconds
525960 Minutes
8766 Hours
365 Days and 6 Hours.

E X A M P L E S.

<i>Years</i>	<i>Mon.</i>	<i>Wee.</i>	<i>Day.</i>	<i>Hou.</i>	<i>Min.</i>	<i>Years</i>	<i>Mo.</i>	<i>We.</i>	<i>Da.</i>	<i>Ho.</i>	<i>Mi.</i>
148	10	2	5	16	22	479	10	1	5	14	16
487	11	3	4	19	48	687	11	3	6	19	22
768	12	1	6	14	11	476	11	2	4	18	23
476	11	2	3	11	16	569	10	1	3	16	14
1882	07	2	6	13	37	2214	05	1	6	20	15
1733	10	0	0	21	15	1734	08	0	1	05	59
1882	07	2	6	13	37	2214	05	1	6	20	15

And thus you may add Numbers of any Names or Denominations.

C H A P. III.

*Subtraction of MONEY, WEIGHT,
M E A S U R E, &c.*

SUBTRACTION teacheth to take one Number out of another, so that the Remainder or Difference may be known.

If the Numbers given be of one Name, then write down first the Greater, and under it the Lesser.

E X A M P L E.

A. lent to B. 6457 l. B. has paid A. 5769 l. how much remains for B. to pay.

l.
Lent 6457
Paid 5769

Begin at the Right Hand, subtract the first Figure of the lesser Number out of the first Figure of the greater Number, and write down the Remainder or Difference directly under them; as 9 from 7 I cannot, therefore I borrow 10 and add it to the 7, and it makes 17, and say 9 from 17 and there remains 8, which I set under the Line; I carry 1 to the next Figure because I borrowed 10, saying, 1 that I borrowed and 6 is 7, saying, 7 from 5 I cannot, but 7 from 15 and there remains 8, which I put under the Line; and say, 1 that I borrowed and

7 is

Of Substraction.

7 is 8, saying, 8 from 4 I cannot, but 8 from 14 and there remains 6, which I put under the Line; then say, 1 that I borrowed and 5 is 6, saying, 6 from 6 and there remains 0.

	<i>l.</i>
Lent	6457
Paid	5769
Remains unpaid	688

So that there remains for B to pay 688 *Pounds*.

If any Figure of the lower Number be greater than the Figure of the upper Number that stands over it, you must increase the lesser Figure by 10, and then subtract as before; and for the 10 borrowed, you must add 1 to the following Figure of the lower Number, as is taught in the foregoing Example.

A Merchant has owing to him 4687 *l.* 10 *s.* 9 *d.* $\frac{3}{4}$ whereof there is paid 1598 *l.* 12 *s.* 6 *d.* $\frac{1}{4}$ how much remains unpaid.

Rank the Numbers as in *Addition*, and begin with the Numbers of the least Name, subtract the lower from the upper Number, and set down the Remainder as is before taught.

EXAMPLE.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Lent	4687	10	9 $\frac{3}{4}$
Paid	1598	12	6 $\frac{1}{4}$

First

Of Subtraction.

21

First I say, $\frac{1}{4}$ Farthing from $\frac{3}{4}$ Farthings and there remains 2 Farthings; then I say, 6 Pence from 9 Pence and there remains 3 Pence, which I put under the Line; then I say, 12 Shillings from 10 Shillings I cannot, but 12 Shillings from 20 Shillings and there remains 8 Shillings, which I add to the 10 Shillings makes 18 Shillings, which I put under the Line and carry 1 to Pounds, saying, 1 and 8 is 9 from 7 I cannot, but 9 from 17 and there remains 8, which I put under the Line and carry 1, saying, 1 and 9 is 10 from 18 and there remains 8, which I put under the Line and carry 1 to 5, saying, 1 and 5 is 6, from 6 and there remains 0, which I put under the Line and then proceed to the next Figure, saying, 1 from 4 and there remains 3, which I put under the Line; and find that there remains unpaid, Three thousand eighty-eight Pounds, Eighteen Shillings, Three Pence Half-penny. See the Work.

	<i>l.</i>	<i>s.</i>	<i>d.</i>	
Lent	4687	10	09	$\frac{3}{4}$
Paid	1598	12	06	$\frac{1}{4}$
Remains unpaid	3088	18	03	$\frac{1}{2}$
Proof	4687	10	09	$\frac{3}{4}$

<i>l.</i>	<i>s.</i>	<i>d.</i>	
6847	17	10	$\frac{1}{2}$
4987	18	11	$\frac{3}{4}$
1859	18	10	$\frac{3}{4}$
6847	17	10	$\frac{1}{2}$

<i>l.</i>	<i>s.</i>	<i>d.</i>	
4968	18	11	$\frac{1}{4}$
3908	16	11	$\frac{1}{2}$
1060	01	11	$\frac{3}{4}$
4968	18	11	$\frac{1}{4}$

If

Of Subtraction.

If a Man lends a Sum of Money, and he receives divers Payments in Part, and you would know how much remains due; you must add the several Payments into one Sum, and substract that Sum from the Sum lent, and the Remainder will shew how much is due.

EXAMPLES.

	<i>l.</i>	<i>s.</i>	<i>d.</i>		<i>l.</i>	<i>s.</i>	<i>d.</i>	
Lent	7846	16	11 $\frac{1}{4}$		7943	10	00 $\frac{1}{4}$	
Paid at several Times.	689	19	10 $\frac{1}{4}$		579	19	11 $\frac{1}{4}$	
	4576	16	11 $\frac{3}{4}$		3698	18	10 $\frac{3}{4}$	
	38	16	10 $\frac{1}{4}$		769	19	11 $\frac{1}{2}$	
	598	18	11 $\frac{3}{4}$		178	16	10 $\frac{3}{4}$	
	1649	19	10 $\frac{1}{2}$		987	17	11 $\frac{1}{2}$	
Paid in all	7554	12	06 $\frac{1}{2}$		6215	13	08	
Remains unpaid	292	04	04 $\frac{3}{4}$		1727	16	04 $\frac{1}{4}$	
Proof	7846	16	11 $\frac{1}{4}$		7943	10	00 $\frac{1}{4}$	

The Proof of *Subtraction*. Add the Remainder to the Sum substracted, and if it make the same Sum with that from which you did substract, it is right, if not, it is false; as in the last Example.

	<i>l.</i>	<i>s.</i>	<i>d.</i>	
Add the Sum substracted to the Remainder	7554	12	06 $\frac{1}{2}$	
	292	04	04 $\frac{3}{4}$	
Proof	7846	16	11 $\frac{1}{4}$	

Averdupoize Weight.

For the Understanding of which you must observe (as you did before) the Title of your Account.

E X A M P L E.

A Grocer buys 74 C. $\frac{1}{2}$ grs. 16 lb. of Sugar, of which he sold 38 C. $\frac{3}{4}$ grs. 19 lb. how much remains unfold. Place this Number thus :

	C.	grs.	lb.
Bought	74	$\frac{1}{2}$	16
Sold	38	$\frac{3}{4}$	19

Begin at the Right Hand, saying, 19 from 16 I cannot, but 19 from 28 and there remains 9, which I add to the 16 makes 25, which I put under the Line; then I say, 1 that I carry and 3 is 4, that is, 0 from 2 and there remains 2, which I put under the Line and carry 1 to *Hundreds*; saying 1 that I carry and 8 is 9 from 4 I cannot, but 9 from 14 and there remains 5, which I put under the Line and carry 1; saying, 1 that I carry and 3 is 4, from 7 and there remains 3, which I put under the Line. I find there remain unfold, *Thirty-five Hundred Weight, Two Quarters and Twenty-five Pound.* See the Work.

Bought

Of Subtraction.

	C.	qrs.	lb.
Bought	74	2	16
Sold	38	3	19
Remains unfold	35	2	25
Proof	74	2	16

	Tun.	C	qrs.	lb.	oz.	T.	C.	qrs.	lb.	oz.	dr.
Bought	54	11	1	16	14	58	18	2	16	10	14
Sold	37	17	2	19	15	49	19	3	17	10	15
Rest	16	13	2	24	15	08	18	2	26	15	10
Proof	54	11	1	16	14	58	18	2	16	10	14

	T.	C.	qrs.	lb.	oz.	dr.
Bought	7946	18	1	11	10	14
Sold at several Times	376 1987 498 36 2798	19 16 18 19 18	2 3 1 3 2	18 19 17 18 16	11 10 11 15 14	15 10 15 14 15
Sold in all	5699	13	2	08	01	05
Remains un- fold	2247	04	3	03	09	09
Proof	7946	18	1	11	10	14

Of Subtraction.

25

Troy Weight.

	lb	oz.	pw.	gr.		lb	oz.	pw.	gr.
Bought	878	06	14	11		5894	11	16	22
Sold	498	10	16	15		4989	10	19	23
Remains	379	07	17	20		0905	00	16	23
Proof	878	06	14	11		5894	11	16	22

Cloth Measure.

	Yds	qr.	na.		Ell. fl.	qr.	na.		Ells.	qr.	na.
Bought	547	0	0		583	1	2		3758	1	2
Sold	498	2	2		498	2	3		2569	2	3
Remains	048	1	2		084	1	3		1188	3	3
Proof	547	0	0		583	1	2		3758	1	2

CHAP. IV.

MULTIPLICATION.



MULTIPLICATION teacheth by Two given Numbers to find a Third, which will contain either of the given Numbers so often as the other contains One or an Unit.

The Greater of the given Numbers is called the *Multiplicand*, and the Lesser is the *Multiplier*.

The Third Number sought or arising by the Multiplication of the other Two, is called the *Product*.

But before you proceed any farther, it is very necessary that the Learner get the following Table

Troy very well by Heart.

C

Multi-

Multiplication Table.

2 times.

2	is	4
3		6
4		8
5		10
6		12
7		14
8		16
9		18
10		20
11		22
12		24

3 times.

3	is	9
4		12
5		15
6		18
7		21
8		24
9		27
10		30
11		33
12		36

4 times

4	is	16
5		20
6		24
7		28
8		32
9		36
10		40
11		44
12		48

5 times

5	is	25
6		30
7		35
8		40
9		45
10		50
11		55
12		60

6 times

6	is	36
7		42
8		48
9		54
10		60
11		66
12		72

7 times

7	is	49
8		56
9		63
10		70
11		77
12		84

8 times

8	is	64
9		72
10		80
11		88
12		96

9 times

9	is	81
10		90
11		99
12		108

10 times

10	is	100
11		110
12		120

11 times

11	is	121
12		132

12 times

12	is	144
----	----	-----

Of Multiplication

27

When the *Multiplicand* consists of more Figures than one, and the *Multiplier* is a single Figure, 574 multiplied by 3, then write them down orderly ; as in the Example following ; viz.

<i>Multiplicand</i>	574
<i>Multiplier</i>	3
<i>Product</i>	

Multiply every Figure of the *Multiplicand* by the *Multiplier*, setting down all under or above Ten or Tens, and for every Ten carry 1 to the next Place, (as is taught in Addition) till you come to the last Place, where you set all down. Thus 3 times 4 is 12, I set down 2 and carry 1 ; then say, 3 times 7 is 21, and 1 that I carry is 22, I set down 2 and carry 2 ; then say 3 times 5 is 15, and 2 that I carry is 17, which I set down, and find the *Product* to be One Thousand Seven Hundred Twenty-two. See the Work.

<i>Multiplicand</i>	574
<i>Multiplier</i>	3
<i>Product</i>	1722

Which is the same as if I had added 3 times 574 together, thus,

574
574
574
1722

Of Multiplication.

When the *Multiplicand* and *Multiplier* consists of 2, 3, 4, or more Figures, place them orderly under one another, as in the Example following; viz.

5876 to be multiplied by 243, what's the *Product*.

$$\begin{array}{r}
 5876 \\
 243 \\
 \hline
 17628 \\
 23504 \\
 11752 \\
 \hline
 1427868
 \end{array}$$

Multiply every Figure of the *Multiplicand* by 3 the first *Multiplier*, and then every Figure of the *Multiplicand* by 4 the second *Multiplier*, and then every Figure of the *Multiplicand* by 2 the third *Multiplier*; then draw a Line, and add them up together as in Addition, and you find the *Product* to be One Million Four Hundred Twenty-seven Thousand Eight Hundred Sixty eight.

Note, That in whatsoever Place the Figure of the *Multiplier* (whether a Cypher or Cyphers) stands from the Place of Units, in the same Place must the first Figure of that *Multiplication* be set from the Unit of the *Multiplicand*; as you may observe in the foregoing Example, and the Example following:

57694 to be multiplied by 25060 what's the *Product*

$$\begin{array}{r}
 57694 \\
 25060 \\
 \hline
 3461640 \\
 2884700 \\
 115388 \\
 \hline
 1445811640
 \end{array}$$

The Proof of Multiplication by the Cross.

$$\begin{array}{r}
 7 \\
 4-1-4 \\
 7
 \end{array}$$

First

Of Multiplication.

29

First I add all the Figures of the *Multiplicand* together, and cast all the Nines out, and set the *Remainder* on the left Side of the Cross, which I find to be 4; then I cast all the Nines out of the *Multipliers*, and place the *Remainder* on the right Side of the Cross, which I find to be 4; then I multiply the Two *Remainders* one by another, and find the *Product* to be 16; then I cast all the Nines out of 16, and I find the *Remainder* to be 7, which I place on the Top of the Cross; and Lastly, I cast all the Nines out of the *Product*, and I find the *Remainder* to be 7, which I place at the Bottom of the Cross; then look and see, if the Figure above the Cross and the Figure below the Cross be alike, the Work is right; if not it's false. Though this is the common Way of proving *Multiplication*, yet its surest Proof is by *Division*.

EXAMPLES.

78469 to be multiplied by 487, what's the *Product*?
Answer, 38214403

98647 to be multiplied by 3794, what's the *Product*?
Answer, 474266718

687946 to be multiplied by 47658, what's the *Product*?
Answer, 32786130468

87698768 to be multiplied by 376854, what's the *Product*?
Answer, 33049631515872

8746 lb of Tobacco at 36 Pence per lb. what comes the Quantity to.

8746

36 d.

5247626238

314856 Pence

8746

3 s.

or 26238 Shillings.

Another Example.

Suppose,

*One Hundred Fires was made on the Elæzian Shore,**One Thousand Spits was plac'd, each Fire before.**Three Hundred Chines of Beef. was fixt on every Spit,**And Twice Three Hundred Greeks, to every Bit.*

I demand how many *Chines* of Beef there were in all,
and how many *Men* there were to eat up that Meat
See the Work.

100 Fires

1000 Spits

100000 Spits

300 Chines on one Spit

30000000 Chines of Beef

600 Men to one Chine

18000000000 Men to all the Chines

So that I find by the Work, That there wa
Eighteen Thousand Million of Men to eat up the *Thirt*
Million of Chines.

By this Method you may multiply any Tw
Numbers you propose.

C H A P

CHAP. V.

Division explained with Variety of Questions for the Learner's Practice.



DIVISION teacheth you to find how often one Number is contained in another. In which you must observe,
1st, The Number given to be divided is called the *Dividend*.

2^{dly}, The Number by which it is to be divided is called the *Divisor*.

3^{dly}, The Number arising from the *Division* is called the *Quotient*, because it signifies how often the *Divisor* is contained in the *Dividend*.

4^{thly}, The *Remainder* is always less than the *Divisor*.

Division is the hardest Lesson in *Arithmetick*, therefore particular Care must be taken in the working hereof, I shall endeavour to make it very plain and easy by the following Examples.

If 6874 Pounds were to be divided amongst 8 Men, I would know each Man's Share?

Draw Two crooked Lines, and place the Sum of Money or *Dividend* between, and 8 the Number of Men on the left Side of the *Dividend* for the *Divisor*.

<i>Divisor</i>		<i>Dividend</i>	<i>Quotient</i> .
8	)	6874	(

C 4

1st,

1st, See how often your *Divisor* is contained in your *Dividend*, and set down the Number of Times in your *Quotient*.

2^{dly}, Multiply the *Divisor* by the Figure placed in the *Quotient*, and set the *Product* underneath the *Dividend*.

3^{dly}, Draw a Line under the *Product*.

Lastly, Subtract that *Product* from the *Dividend*, and set the *Remainder* underneath the Line. Observe the Work; viz.

$$8) 6874 \quad (8$$

I demand how many times the *Divisor* 8 is in 6, I cannot, but in 68, the Answer is 8 times, which I place in the *Quotient*; then I multiply the *Divisor* by the Figure in the *Quotient*, and the *Product* is 64, which I put underneath the *Dividend* 68, and draw a Line underneath the 64, and subtract it from the *Dividend* 68, and set the *Remainder* under the Line and then the Work will stand thus,

$$\begin{array}{r} 8) 6874 \quad (8 \\ \underline{64} \\ 47 \end{array}$$

Then I put a Point or Dot under the 7 in the *Dividend*, and bring it down under the Line, and set it after the *Remainder* 4, which is 47, a new *Dividend*; then I ask how many times the *Divisor* 8 is found in 47, I find 5 times, which I place in the *Quotient*, then I multiply the *Divisor* by 5 in the *Quotient*, the *Product* is 40, which I put under the *Dividend* 47, and draw a Line underneath the 40 and subtract it from the *Dividend* 47, and set the *Remainder* under the Line, and then the Work will stand thus.

Of Division.

33

$$\begin{array}{r}
 8) 6874 \text{ (85} \\
 \underline{64} \\
 47 \\
 \underline{40} \\
 7
 \end{array}$$

Then I put a Point under the 4 in the *Dividend*, and bring it down under the Line, and set it after the *Remainder* 7 which is 74, a new *Dividend*. Then I ask how many times 8 the *Divisor* is found in 74, I find 9 times, which I place in the *Quotient*, then I multiply the *Divisor* by 9 in the *Quotient*, and the *Product* is 72, which I put under the *Dividend* 74: and draw a Line underneath the *Product* 72, and substra t it from the *Dividend* 74, and set the *Remainder* under the Line, and then the Work will stand thus.

$$\begin{array}{r}
 8) 6874 \text{ (859} \\
 \underline{64} \\
 47 \\
 \underline{40} \\
 74 \\
 \underline{72} \\
 2
 \end{array}$$

The Work is finished, the *Quotient* is found to be 859 Pound, for every Man's Share, but there remains 2 Pounds (which being multiplied by 20 s. and divided by 8, every Man's Share will be 5 Shillings. So that

C 5

that

that I find every Man's Share to be *Eight Hundred Fifty-nine Pounds Five Shillings*.

Note, That if the first Figure of the *Dividend* towards the Left-Hand, be lesser than the first Figure of the *Divisor*, then you must try the *Divisor* in the two first Figures towards the Left-Hand of the *Dividend*, as in the last Example.

To prove Division.

Multiply your *Quotient* by your *Divisor* or *Divisors*, (and to the *Product* add your *Remainder* if any be) if it's right, the *Product* of the *Multiplication* will be equal to your *Dividend* ; if otherwise, your Work is false.

When the *Divisor* consists of more Figures than one, then you must set out as many Figures towards the Left-Hand of the *Dividend*, as there are Figures in the *Divisor*, and put a Dot under that Figure of the *Dividend* which stands next the Right-Hand.

Then see how often the first Figure of the *Divisor* is contained in the first Figure of the *Dividend*, and set the Answer in the *Quotient*.

Multiply the Figures of the *Divisor* by the Figure in the *Quotient*, and set the *Product* in Order under the *Dividend*.

Then subtract the said *Product* from the *Dividend*, setting the *Remainder* under the Line.

Then put a Dot under the next Figure of the *Dividend*, and put it even with the *Remainder*, so you have a new *Dividend*, with which you are to proceed as is before taught.

E X A M P L E.

A Company of Boys, in Number 24, went into an Orchard and gathered 37680 Apples, and agreed they should be equally shared amongst them, I would know each Boy's Share ?

Divisor

Of Division.

35

$$\begin{array}{r} \text{Divisor} \quad \text{Dividend} \quad \text{Quotient} \\ 24 \) \ 37680 \end{array}$$

I ask how many times 2 is in 3, is once, which I place in the *Quotient*; then I multiply the Figures in the *Divisor* by the Figure in the *Quotient*, and set the *Product* under the two first Figures in the *Dividend*, draw a Line and subtract the *Product* from the *Dividend*, and set the *Remainder* under the Line which is 13, then I put a Dot under the next Place in the *Dividend*, which is 6, and set it even with the *Remainder* 13, and it makes 136 a new *Dividend*, and then the Work will stand thus,

$$\begin{array}{r} 24 \) \ 37680 \ (\ 1 \\ \underline{24} \\ 136 \end{array}$$

Then I ask how often I can have the first Figure of the *Divisor* in 13, I find 5 times, which I put in the *Quotient*, and thereby multiply the *Divisor*, and the *Product* is 120, which I set under the *Dividend* 136, then draw a Line and subtract as before, and set the *Remainder* under the Line, then I put a Dot under the next Place in the *Dividend*, which is 8, and set it even with the *Remainder* 16, and it makes 168 a new *Dividend*, and then the Work will stand thus,

$$\begin{array}{r} 24 \) \ 37680 \ (\ 15 \\ \underline{24} \\ 136 \\ \underline{120} \\ 168 \end{array}$$

Then

Then I ask how often I can have the first Figure of the *Divisor* in 16, I find 7 times, which I put in the *Quotient*, and thereby multiply the *Divisor*, and the *Product* is 168, which I set under the *Dividend*, then draw a Line and subtract as before, and then the Work will stand thus,

$$\begin{array}{r}
 24 \overline{) 37680} \quad (1570 \\
 \underline{24 } \\
 136 \\
 \underline{120} \\
 168 \\
 \underline{168} \\
 00
 \end{array}$$

Then I take down the 0, and put it under the Line, there being never another Figure, I put an 0 in the *Quotient*, and the work is finished.

And I find each Boy's Share to be 1570 Apples.

Note, That when you have multiplied the *Divisor* by the Figure in the *Quotient*, if the *Product* be greater than the *Dividend*, then you must cancel that and try one that is lesser; and if the *Remainder* is greater, then the *Divisor*, the Figure last placed in the *Quotient* is too little, therefore you must cancel that and put a bigger in its room.

E X A M P L E.

There is a Ship taken by 475 Seamen, which is valued at 74568 Pounds, to be equally divided amongst them, I demand each Man's Share.

Of Division.

37

475) 74568 (156 l. each Man's Share.

475

2706

2375

3318

2850

468 Pounds remain.

20 Shillings.

475) 9360 (19 s. each Man's Share of the Shillings.

475

4610

4275

335 Shillings. remains.

12 Pence.

475) 4020 (8 d. each Man's Share of the Pence.

3800

220 Pence remains

4 Farthings.

475) 880 ($\frac{1}{4}$ each Man's Share of the Farthings.

475

405 Farthings remains.

So that I find each Man's Share to be 156 l. 19 s.
8 d. $\frac{1}{4}$ $\frac{405}{475}$ Part of a Farthing.

Note, That when a Sum of Money is to be divided amongst a Number of Men, and if any Sum remains,

mains, every Person must have an equal Share thereof; if the *Remainder* is *Pounds*, multiply by 20, to bring them into *Shillings*; if *Shillings*, by 12 to bring them into *Pence*; if *Pence*, by 4 to bring them into *Farthings*, and divide every *Product* by the common *Divisor*, and the *Quotient* will answer every Man's Share in *Shillings*, *Pence*, and *Farthings*. See the foregoing Example.

Questions for the Learner to practice.

There is a City taken in the Wars by 3655 Soldiers that was worth 87469576 *Pounds*, I demand each Soldier's Share of the *Pounds*?

Answer, 23931 *l.* 9 *s.* 8 *d.* $\frac{1}{4}$ $\frac{5}{8}$ $\frac{5}{8}$.

As for the *Remainders* of any *Divisions*, I shall shew you what they are when you practice *Fractions*.

There are 4576 Soldiers to march 16 in one Rank or File, how many Files will they make?

Answer, 286 Files.

There is a Tax of 1442100 *Pounds* to be equally raised by 57684 *Parishes*, I would know what each *Parish* must pay?

Answer, 25 *l.*

There is 4698 *Pounds* of Powder to be employed in an Assault or Battery with 6 Pieces of Cannon, the First Piece shooteth 4 *Pounds*, the Second 6 *Pounds*, the Third 8 *Pounds*, the Fourth 10 *Pounds*, the Fifth 12 *Pounds*, and the Sixth 14 *Pounds*, I demand how many Shoots each Piece may make, to make an equal Number of Shots?

Answer, 87.

There was 5000 *Pence* given to be divided between 20 poor People, I desire to know the Number of *Pence* each Person had?

Answer, 250

ereof; A Horfe was cut into 400 Pieces to be distributed
bring between 16 Dogs, how many Pieces had each Dog
them for his Share?

Answer, 25.

Far- A Shepherd driving 100 Sheep, in the Way met
nmon 10 plundering Soldiers, who demanded the Half
Man's of his Sheep to be equally divided amongst them,
the now I would know how many Sheep each Soldier
had for his Share?

Answer, 5.

Sol- A Man Travelling fell among Thieves, (in Num-
mand ber 8) searching his Pockets, they found 8766 Pence,
I demand each of their Shares, it being equally
divided among them, they first giving him 350
Pence back to bear his Charges?

Answer, 1052 d.

shall There was 6 Men digging a Field, and they
tions found 87690 Crowns, they being all at the finding
nk or them consented to share the Money equally, I
desire to know each Man's Share?

Answer, 14615 Crowns.

ually Forty Dogs hunting a Stag, after the Sport was o-
what ver the Stag was cut into 840 Pieces to be divided
among the Dogs, how many Pieces had each Dog
for his Share?

Answer, 21 Pieces.

nnon, If 152 Hundred Weight cost 760 l. what will
econd 1 Hundred Weight cost?

Answer, 5 l.

Sixth A Woman gave 744 Oranges between 24 Girls,
Piece how many Oranges had each Girl for her Share?

Answer 31 Oranges.

Twelve Merchants joined together and freighted out
a Ship to Sea, when she came Home her Cargo a-
mounted to 987846048 Crowns, I demand each
Merchants Share, they being equally concerned.

Answer, 82320504 Crowns.

C H A P.

CHAP. VI.

REDUCTION of Money, Weight
and Measure.

REDUCTION teacheth y^e
to bring all Great Names into Sm^{all}
by Multiplication.

And all Small Names are broug^{ht}
into Great by Division.

Note that	{	4 Farthings	}	is	{	1 Penny	}
		12 Pence				1 Shilling	
		20 Shillings				1 Pound	
		40 Sixpences				1 Pound	
		60 Groats				1 Pound	
		80 Threepences				1 Pound	
		120 Twopences				1 Pound	
		240 Pence				1 Pound	
		480 Halfpence				1 Pound	
		960 Farthings				1 Pound	

The Names and Value of English Coins.

		s. d.		Pence.		Farthing
A Guinea	{	21-6	{	258	{	1032
A Mark		13-4		160		640
A Pistole		17-0		204		816
An Angel		10-0		120		480
A Noble	{	6-8	{	80	{	320
A Crown		5-0		60		240
A Dollar		3-4		40		160
A Half-Crown		2-6		30		120

Of Reduction.

41

In 746875898 Farthings, how many Pence,
Shillings, and Pounds?

746875898 Farthings.

4 Farthings

186718974 $\frac{1}{2}$ Pence.

12 Pence

15559914 6 Shillings.
2 0 Shillings.

777995 14 6 $\frac{1}{2}$
20

15559914
12

186718974
4

746875898 Proof.

In

l. s. d.
In 7654 16 11 $\frac{1}{4}$, how many Shillings, Pence,
and Farthings?

l. s. d.
7654 16 11 $\frac{1}{4}$
20 Shillings.

153096 Shillings.
12 Pence.

1837163 Pence.
4 Farthings.

7348653 Farthings.
4

Proof 1837163 $\frac{1}{4}$
12

153096 11
2 0

7654 16 11 $\frac{1}{4}$

Of Reduction.

43

Pence,

Merchant delivered 2000 l. to be exchanged for 13 d. $\frac{1}{2}$, 12 d. 9 d. 6 d. 4 d. $\frac{1}{2}$, 3 d. and Twopences, and of each a like Number, how many must he have of each Sort in exchange for the aforesaid Sum?

<i>l.</i>		<i>d.</i>
2000		13 $\frac{1}{2}$
20		12
		9
40000		6
12		4 $\frac{1}{2}$
	<i>Pieces</i>	3
50)480000(	9600	2
450	50	
		50
300	480000	
300	12	
000	4000 0	
000	2 0	
000	2000	
000		
00		

	<i>d.</i>		<i>l.</i>
9600 Pieces of	13	each is	540
	12		480
	9		360
	6		240
	4		180
	3		120
	2		80
			2000

A

In 587647689 Farthings, how many Pence, Groats, Dollars, Nobles, and Marks?

In

44

Of Reduction.

In 468987698 Farthings, how many Guineas?

Answer, 454445 $\frac{418}{1032}$.

In 7458758 Pistoles, how many Shillings, Pence and Farthings?

Answer, $\begin{cases} 126798886 \text{ Shillings.} \\ 1521586632 \text{ Pence.} \\ 6086346528 \text{ Farthings.} \end{cases}$

WEIGHT.

IN 746874689 Ounces, how many Pounds, Quarters, Hundreds and Tuns?

	lb	Qrs:
16) 746874689 (28) 46679668 (1667131		
64	28	4
106	186	41678 2--3 Hundred.
96	168	2 0
108	187	Tuns 20839--2--3---0--1
96	168	
127	199	
112	196	
154	36	
144	28	
106	86	
96	84	
108	28	
96	28	
129	00	
128		
1		

Note,

Of Reduction.

45

Note, That whenever you find the Word (each) have a special Regard to it, and reduce the Particulars which it implieth into one Denomination, that when you know how much is contained in one, you may easily know how much is contained in all.

In 54678 C. $\frac{1}{2}$ 17 lb. how many *Parcels* are contained in the same, each *Parcel* weighing 1 C. $\frac{1}{2}$ 14 lb.

C. lb
54678 $\frac{1}{2}$ 17
4 *Quarters.*

218714 *Quarters.*
28 *Pounds.*

1749719
437429

182) 6124009 (33648 *Parcels.*
546

664
546

1180
1092

880
728

1529
1456

73 *Pounds remaining.*

C. lb
1 $\frac{1}{2}$ 14
4 *Quarters:*

6 *Quarters.*
28 *Pounds.*

52
13

182 *Pounds in one*
Parcel.

A Merchant bought 4 Tun. 14 C. $\frac{1}{2}$ 17 lb. of Sugar and ordered it to be made up into Parcels of 24 lb. of 20 lb. of 16 lb. of 12 lb. of 8 lb. of 4 lb. and of 2 lb. and of each a like Number, how many Parcels will be made of the Sugar.

Tuns	C.	lb.	lb.
4	14	$\frac{1}{2}$	17
	20		24
			20
			16
			12
			8
			4
			2
			86 lb. in all the Parcels
94			
4			
378			
28			
3031			
757			

86)10601(123 Parcels of each.
86

200

172

281

258

23

Parcels	lb	lb
123 of	24 each is	2952
123 of	20 each is	2460
123 of	16 each is	1968
123 of	12 each is	1476
123 of	8 each is	984
123 of	4 each is	492
123 of	2 each is	246

10578

23

Proof

10601

In 7465 Tun. 18 C. $\frac{3}{4}$ qrs. 16 lb. 10 oz. how many
Hundreds, Quarters, Pounds, and Ounces?

In

Of Reduction.

47

In 7646876 C. $\frac{1}{2}$ 17 lb. how many Parcels are contained in the same of 50 lb. of 40 lb. of 30 lb. of 20 lb. of 16 lb. of 12 lb. of 8 l. of 4 lb. of 2 lb. and of each a like Number.

Troy Weight.

In 57468798 Grains, how many Pennyweight, Ounces and Pounds?

Grains	Grains	Pennyweight.
24) 57468798	(239453 3	
48	2 0	Pennyweight.

<u>94</u>	119726	13 Ounces
72		12 Ounces.
<u>226</u>	<u>9977</u>	<u>2</u>
216		<u>13</u>
		<u>6</u>

108

96

127

120

79

72

78

72

6

Proof.

lb	oz.	pw.	gr.
9977	2	13	6
	12 Ounces.		

119726 Ounces:

20 Pennyweight.

2394533 Pennyweight.
24 Grains.

9578138
4789066

57468798 Grains.

In

48

Of Reduction.

In 87469 lb. 11 oz. 10 pw. 22 gra. how many Ounces In Pennyweights, and Grains?

In 4698 Ingots, each weighing 2 lb. 10 oz. 11 pw. 17 gr. how many Grains in all?

T I M E.

In 4768768798 Minutes, how many Hours, Days, Weeks, Months, and Years.

476876879 | 8 Minutes.
6 | 0 Minutes.

Hours 79479479 | 58
24) 72 : : : : (3311644 Days.
7 Days.

74
72
473092 Weeks.
4 Weeks.

27
24
118273 Months.
13) 117 : : (9097 Years.

39
24
127
117

154
144
103
91

107
96
12

119

96

23

In the Minutes are found
Years Mon. We. Da. Hon. Mi. 17
9097 12 0 0 23 5

In 54

Of Reduction

49

unces In 546 Years, how many Months, Weeks, Days, Hours, and Minutes?

i pw How many Minutes is it since the Creation of the World, it being accounted 5657 Years since?

Land Measure.

Days In 5468769876 Barley-Corns, how many Inches, Feet, and Yards?

Barley-Corns.

5468769876

3 Barley-Corns.

1822923292 Inches.

12 Inches.

151910274 Feet, and 4 Inches

3 Feet.

50636758 Yards.

3

151910274 Feet.

12

1822923292 Inches.

3

5468769876 Barley-Corns.

In 7689 Miles, how many Barley-Corns?

found Answer, 1461525120 Barley-Corns.

ton. Mi 175469 Yards, how many Paces, each 1 Foot $\frac{1}{2}$.

23 5 Answer, 350938 Paces.

How many Barley-Corns will reach from London to Berwick, it being accounted 250 Miles distant?

In 54 D Wine

Wine Measure.

In 74687469 Pints, how many Quarts, Pottles Gallons, Hogshheads, and Tuns?

Pints.

74687469

2 Pints.

37343734 Quarts and 1 Pint.

2 Quarts.

18671867 Pottles.

2 Pottles.

Gallons

63) 9335933(1

63.....

148189 Hd.

4 Hogsh.

303

252

515

504

119

63

563

504

593

567

26

The Proof.

Tun. hd gal. pot. qt.

37047-1-26-1-0-

4 Hogshheads.

148189 Hogshheads.

63 Gallons.

444573

889136

9335933 Gallons.

2 Pottles.

18671867 Pottles.

2 Quarts.

37343734 Quarts.

2 Pints.

74687469 Pints.

Of Reduction.

51

In 7689 Tuns, how many Pints?

In 57694 Hogsheads, how many Rundlets, each containing 5 Galls. $\frac{3}{4}$.

Answer, 632125.

Cloth Measure.

In 76874687 Nails, how many Quarters and Yards?
4 Nails.

19218671 Quarters and 3 Nails.
4 Quarters.

4804667 Yards $\frac{3}{4}$.
4 Quarters.

19218671 Quarters.
4 Nails.

76874687 Nails.

In 769458 Ells Flemish, how many Quarters, and Nails?

In 87468 English, how many Nails, Quarters, and Yards?

In 68768 Packs, each 40 Cloths, and each Cloth 54 Yards, how many Quarters and Nails?

Answer, $\left\{ \begin{array}{l} 594155520 \text{ Quarters.} \\ 2376622080 \text{ Nails.} \end{array} \right.$

C H A P. VII.

Of F R A C T I O N S.



F R A C T I O N is a Part or Part of an *Integer* or whole one, as if you would express 3 Quarters of a *Yard* in Figures, you express it thus $\frac{3}{4}$ of a *Yard*; or 15 *Shillings* thus $\frac{15}{20}$ of a *Pound*.

All *Fractions* are express'd by Two Figures, where of the Lower denominates the Parts into which the *Integer* is divided, and is called the *Denominator*; and the uppermost Figure expresseth the Number of these Parts that the *Fraction* contains, and is called the *Numerator*.

3 *Numerator*.

4 *Denominator*.

Note that 1 or an *Unit*, is not always the *Integer* or Whole, but any Number of *Pounds* may be put for the Whole; as if the Stock of 6 Merchants be 1000 *l*. then you may express the Sixth Part of the Stock thus:

$\frac{1}{6}$ of 1000 *l*.

If the *Numerator* of any *Fraction* be less than the *Denominator*, then that *Fraction* is less than an *Integer* and is called a proper *Fraction*; such as

4
8

Of Fractions.

53

If the *Numerator* of a *Fraction* is greater than the *Denominator*, such a *Fraction* is greater than an *Integer*, and is called an *improper Fraction*; as

$$\frac{8}{4}$$

$$\frac{4}{4}$$

If the *Numerator* of a *Fraction* is equal to the *Denominator*, then that *Fraction* is equal to one whole *Integer* or *Sum*; as,

$$\frac{5}{5}$$

$$\frac{5}{5}$$

The Reason of all these is evident; for the *Integer* contains (as is shown) just so many *Parts* as the *Denominator* does express.

If any *Integer* be divided into *Parts*, and some of these be subdivided into other *Parts*, then these last *Parts* are express'd with *Two Fractions*, with the Word (of) between them; so 3 *Farthings* will be express'd thus, $\frac{3}{4}$ of a *Penny*, of $\frac{1}{12}$ of a *Shilling*, of $\frac{1}{20}$ of a *Pound*; Thus,

$$\frac{3}{4} \text{ of } \frac{1}{12} \text{ of } \frac{1}{20}.$$

And such a *Fraction* is called a *Fraction of a Fraction*. If a whole Number has a *Fraction* joyn'd to it thus,

$$1.$$

$$4 \frac{1}{2}$$

Then it is called a *Mixt Number*.

Reduction.

1st, To reduce a *Fraction* of a *Fraction* into one single *Fraction*, multiply all the *Numerators* continually, the *Product* is a new *Numerator*; also multiply all the *Denominators* continually, the *Product* is a new *Denominator*.

D 3

E X-

EXAMPLE.

I would have reduced $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$ of a Pound into one Denomination.

I say 2 and 3 is 6, and 4 times 6 is $\underline{24}$ Numerator.

I say 3 and 4 is 12, and 5 times 12 is $\underline{60}$ Denominator.

I find the Answer to be $\frac{24}{60}$ of a Pound.

2dly, To reduce a greater Fraction into a lesser Term, or to abbreviate a Fraction.

First, by a General Rule, divide the Denominator by the Numerator, and the Numerator by the Remainder, (if any be) and thus continue dividing the Divisor by the Remainder, till you find a Divisor that divides without leaving a Remainder.

EXAMPLE.

$$\begin{array}{r}
 \begin{array}{r}
 6154 \overline{) 8326} (1 \\
 \underline{6154} \\
 2172
 \end{array}
 \begin{array}{r}
 6154 (2 \\
 \underline{4344} \\
 1810
 \end{array}
 \begin{array}{r}
 2172 (1 \\
 \underline{1810} \\
 362
 \end{array}
 \begin{array}{r}
 1810 (5 \\
 \underline{1810} \\
 0
 \end{array}
 \end{array}$$

Then divide both the Numerator and Denominator by the last Divisor.

EX-

Of Fractions.

55

EXAMPLE.

$ \begin{array}{r} 62 \overline{) 6154} \quad (17 \text{ Numerator.} \\ \underline{362} \\ 2534 \\ \underline{2534} \\ 00 \end{array} $	$ \begin{array}{r} 362 \overline{) 8326} \quad (23 \text{ Denominator.} \\ \underline{724} \\ 1086 \\ \underline{1086} \\ 00 \end{array} $
---	--

So that $\frac{17}{3}$ is equal to $\frac{6\frac{1}{3}\frac{5}{3}\frac{4}{3}}$.

Lastly, When you can divide any of the 9 Figures, in the *Numerator* and *Denominator* without a *Remainder*, divide them both by that Figure, and take their *Quotients* in their stead.

EXAMPLES.

$$\frac{1}{2} \frac{20}{40} \mid \frac{60}{80} \mid \frac{30}{60} \mid \frac{15}{30} \mid \frac{3}{6} \mid \frac{1}{2}$$

So that $\frac{1}{2}$ is equal to $\frac{120}{240}$.

3dly, To Reduce a whole Number into an improper *Fraction*, place 1 under the whole Number as a *Denominator*; thus,

$\frac{10}{1}$ of a Pound.

4thly To Reduce improper *Fractions* into whole Numbers.

$$\frac{26}{5}$$

Divide the *Numerator* by the *Denominator*, and the *Quotient* is the Number sought.

$$\begin{array}{r}
 5 \overline{) 26} \quad (5 - \frac{1}{5} \text{ of a Pound, or } 4 \\
 \underline{25} \\
 1
 \end{array}$$

D 4

To

5th, To reduce 2, 3, or more *Fractions* that have unequal *Denominators*, to *Fractions* of the same value that have equal *Denominators*.

E X A M P L E.

$$\frac{2}{3}$$

$$\frac{3}{4}$$

$$\frac{4}{5}$$

Multiply all the *Denominators* together for a common *Denominator*, saying 3 times 4 is 12, and 12 times 5 is 60.

Then multiply the *Numerator* of the first in all the other *Denominators*, except its own *Denominator*, as 2 times 4 is 8, and 5 times 8 is 40.

Then multiply the second *Numerator* in all the *Denominators* except its own *Denominator*, as 3 times 5 is 9, and 5 times 9 is 45.

Then multiply the third *Numerator* in all the *Denominators*, except its own *Denominator*, as 3 times 12 is 36, and 12 times 4 is 48. See the Work.

40	45	48
$\frac{2}{3}$	$\frac{3}{4}$	$\frac{4}{5}$
60		

Proof.

So that $\frac{40}{60}$ is equal to $\frac{2}{3}$

$$\frac{40}{60} \div \frac{20}{30} = \frac{10}{15} = \frac{2}{3}$$

$\frac{45}{60}$ is equal to $\frac{3}{4}$

$$\frac{45}{60} \div \frac{15}{20} = \frac{3}{4}$$

$\frac{48}{60}$ is equal to $\frac{4}{5}$

$$\frac{48}{60} \div \frac{24}{30} = \frac{12}{15} = \frac{4}{5}$$

6th, To Reduce a whole Number joyned with a Fraction into one Name.

E X A M P L E.

$$\begin{array}{r}
 \text{Yards} \\
 6 - \frac{1}{2} \\
 2 \\
 \hline
 13 \\
 2 \\
 \hline
 \end{array}$$

Facit. $\frac{13}{2}$

7th, How to find the Value of a single Fraction in the known Parts of the Integer, either of Money, Weight, or Measure.

Multiply the Numerator of the Fraction, by the Number of the known Parts of the next inferior Denomination which are equal to the Integer, and divide that Product by the Denominator, so is the Quotient the Value of the Fraction in that inferior Denomination.

And if there happens to be any Fraction in the Quotient (or Remainder of the Division) you may find the Value thereof in the next inferior Denomination by the same Rule, and so proceed to the least known Parts, as is taught in Division.

EXAMPLE.

What is the $\frac{7}{11}$ of a Pound Sterling.

$$\begin{array}{r}
 140 \\
 \hline
 \frac{7}{11} \text{ of } \frac{20}{1} \text{ Shillings.} \\
 \hline
 11 \overline{) 140} (12 \text{ Skill.} \\
 \underline{11 } \\
 30 \\
 \underline{22} \\
 8 \text{ Shil. remains} \\
 12 \\
 \hline
 11 \overline{) 96} (8 \text{ Pence.} \\
 \underline{88}
 \end{array}$$

So that $\frac{7}{11}$ of 20 Shillings is equal 8 Pence rema.

	<i>s.</i>	<i>d.</i>	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{64}$
to 12	8							
$\frac{4}{11}$ of 20 <i>s.</i>	7	3	$\frac{1}{4}$	$\frac{1}{11}$				
Proof	20	0	0					

$$\begin{array}{r}
 11 \overline{) 32} (2 \text{ Farthing} \\
 \underline{22} \\
 10 \text{ remains.}
 \end{array}$$

Examples for the Learner's Practice.

What is the $\frac{7}{11}$ of an Ell English?Answer, 3 qrs. 3 na. $\frac{5}{8}$ of a NailWhat is the $\frac{4}{5}$ of a Yard?Answer 3 qrs $\frac{1}{5}$.What is the $\frac{5}{6}$ of a Crown.

Answer 4 s. 2 d.

What is the $\frac{2}{11}$ of a Hundredweight?Answer, 3 qrs. 16 lb. 12 oz. $\frac{8}{11}$ What is $\frac{5}{8}$

Of Fractions.

59

What is the $\frac{6}{7}$ of Barrel of Beer ?

Answer, 30 Gall. 3 qrts. 0 pt. $\frac{6}{7}$.

What is the $\frac{3}{4}$ of a Tun of Iron ? Answ. 15 C.

What is the $\frac{9}{11}$ of a Tun of Wine ?

What is the $\frac{6}{8}$ of a Quarter of Wheat ?

What is the $\frac{7}{10}$ of a Mark ?

What is the $\frac{4}{5}$ of a Chaldron of Coals ?

What is the $\frac{3}{8}$ of a Hogshead of Wine ?

What is the $\frac{8}{12}$ of a Gallon ?

What is the $\frac{2}{5}$ of a Gros.

What is the $\frac{1}{2}$ of 687—19—11 $\frac{3}{4}$
20 Shillings.

13759

12 Pence.

165119

4 Farthings.

660479

Multiply by 5 Numerator.

3302395

Divide by 6 the Denominator.

Farthings 550399 $\frac{1}{2}$ of a Farthing.

4

Pence 137599 $\frac{3}{4}$

12

Shillings 11466—7

2 0

573—6—7— $\frac{3}{4}$ $\frac{1}{2}$, this is

What is the $\frac{1}{2}$ th Part of 687 l. 19 s. 11 d. $\frac{3}{4}$. What

What is the $\frac{1}{6}$ of 660479 Farthings.
Divide by 6 the Denominator.

Farthings 110079 $\frac{5}{6}$ of a Farth.

4

Pence 27519 $\frac{3}{4}$

12

Shil. 229 | 3 - 3

2 | 0

114-13-3 $\frac{5}{4}$ $\frac{5}{4}$ the $\frac{1}{2}$ th Part
573-06-7 $\frac{3}{4}$ $\frac{1}{6}$ 687 l. 19 s. 11 d.

Proof 687-19-11 $\frac{3}{4}$

What is the $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of 10 Shillings?

6

$\frac{1}{2}$ of $\frac{2}{4}$ of $\frac{3}{4}$

24

720

$\frac{6}{24}$ of $\frac{120}{720}$

24)720(30 Pence, or the $\frac{1}{4}$ of an
720 gel is equal to the $\frac{1}{2}$
00 $\frac{2}{3}$ of $\frac{3}{4}$ of an Angel.

8th, To reduce *Fractions of Fractions* into 1 single Fraction.

$\frac{6}{5} + \frac{3}{15} + \frac{1}{4}$ of 10 s.

$$\begin{array}{r} s. \quad s. \quad d. \\ 4) 10(2-6 \\ \underline{8} \end{array}$$

$\frac{3}{4} + \frac{1}{2}$ of a Shil. or 6 d.

ADDITION.

Addition of single Fractions, if they have one common Denominator, then add their Numerators, and set their Sum above the common Denominator.

EXAMPLE:

Add $\frac{3}{8}$ and $\frac{4}{8}$ together, $\frac{3}{8} + \frac{4}{8}$ Ans. $\frac{6}{8}$ or one whole one.

Addition of Fractions of Fractions.

First reduce the *Fractions of Fractions* to single Fractions, as is taught in *Reduction*, and then add them as is taught.

EXAMPLE.

$$\begin{array}{r} \text{Add } \frac{6}{21} \text{ of } \frac{6}{7} \text{ and } \frac{15}{40} \text{ of } \frac{5}{8} \text{ together.} \\ \hline 21 \qquad \qquad \qquad 40 \end{array}$$

$$\begin{array}{r} 240 \\ \hline \frac{6}{21} \qquad \frac{15}{40} \\ \hline 315 \end{array}$$

Answer, $\frac{240}{315}$. Add

Add $\frac{7}{8}$ of 3 Pounds Sterling to the $\frac{3}{4}$ of a Penny, I reduce the $\frac{3}{4}$ of a Penny into this: *Viz.* $\frac{3}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$.

$\begin{array}{r} 3 \\ \hline \frac{3}{4} \text{ of } \frac{1}{12} \text{ of } \frac{1}{20} \\ \hline 960 \end{array}$	$\begin{array}{r} 6720 \\ \hline \frac{3}{960} \text{ to } \frac{7}{8} \\ \hline 7680 \end{array}$
Answer, $\frac{6720}{7680}$	

Addition of Mixt Numbers.

First find the Sum of the Fraction joyned to them (by the foregoing Rules) and if there be any Integers in that Sum, add them to the Integers, and place their Sum, and the Fraction remaining (if there remains any) together, and then you have the Total Sum.

E X A M P L E.

Six Persons was to pay their following Shares of 6 l. 0 s. 5 d. $\frac{1}{2}$.

		l.	s.	d.	qrs.	
A.	was to pay	0	14	04	0	$\frac{1}{4}$
B.		1	02	11	$\frac{1}{4}$	$\frac{1}{4}$
C.		1	08	08	0	$\frac{2}{4}$
D.		1	00	00	$\frac{3}{4}$	$\frac{2}{4}$
E.		1	00	00	$\frac{3}{4}$	$\frac{2}{4}$
F.		0	14	04	0	$\frac{1}{4}$
Total		6	00	05	$\frac{1}{2}$	

of a Farthing.

Three Persons was to pay the Sum of 14 l. *viz.*

	l.
A. was to pay	7
B. was to pay	4 $\frac{9}{10}$
C. was to pay	2 $\frac{10}{100}$
Total	14 l.

And

And thus you may add *Fractions* of any other differing Denominations.

SUBTRACTION.

Is the taking of one *Fraction* from another, a Less from a Greater, or an Equal from an Equal.

If the *Fractions* be single *Fractions*, and have equal Denominators, then substract the lesser Numerator from the greater, and place the Remainder over the common Denominator.

EXAMPLE.

Substract $\frac{4}{7}$ from $\frac{6}{7}$ and there remains $\frac{2}{7}$, and $\frac{3}{4}$ from $\frac{1}{4}$ and there remains $\frac{1}{4}$.

Subtraction of Fractions of Fractions.

First reduce them to single *Fractions* of the same Denomination, and then substract as is taught.

EXAMPLE.

Substract $\frac{1}{4}$ of $\frac{4}{8}$ from $\frac{1}{3}$ of $\frac{7}{9}$.

$$\begin{array}{r} 4 \\ \hline \frac{1}{4} \text{ of } \frac{4}{8} \\ \hline 32 \end{array}$$

$$\begin{array}{r} 7 \\ \hline \frac{1}{3} \text{ of } \frac{7}{9} \\ \hline 45 \end{array}$$

$$\begin{array}{r} 44 \\ \hline 180 \quad 224 \\ \frac{4}{32} \quad \frac{7}{45} \\ \hline 1440 \end{array}$$

Answer, $\frac{44}{1440} \mid \frac{22}{720} \mid \frac{11}{360}$.

To substract a Fraction from a whole Number.

Reduce the whole Number to a *Fraction*, having the same Denominator with the *Fraction* given, and then substract thus :

EXAMPLE:

EXAMPLE.

Subtract $\frac{3}{8}$ from 5 l.

$\frac{3}{8}$ from $\frac{3}{8}$ and there remains $\frac{2}{8}$ which being divided by the Denominator 6) 27 (4 l. $\frac{3}{8}$ or 10 s.

24

Remains $\frac{3}{8}$ of a Pound.

Lent	5 l.
Paid	0 $\frac{3}{8}$
l. 4	$\frac{3}{8}$
5 l.	

Lent	6 l.
Paid	0 $\frac{3}{4}$
l. 5	$\frac{1}{4}$
Proof	6 l.

To subtract a whole Number and a Fraction from a whole Number and a Fraction.

Reduce your Fractions into one Denomination then subtract the one Numerator from the other, and for the Integers subtract as you were taught in whole Numbers.

EXAMPLE.

Received	40 $\frac{6}{8}$	2
Paid	24 $\frac{5}{7}$	40 $\frac{6}{8}$
		42 $\frac{5}{7}$
Remains	16 $\frac{2}{5}$	56
		2
Received	27 $\frac{3}{4}$	6
Paid	17 $\frac{1}{2}$	3
		8
Remains	10 $\frac{1}{4}$	

or it may be work'd thus

Remains $\frac{2}{5}$ or $\frac{1}{4}$

Bought

	C.	lb.
Bought	14 $\frac{1}{2}$	14
Sold	10 $\frac{2}{7}$	8

$\frac{1}{2}$ of 28 is 14
 $\frac{2}{7}$ of 28 is 8

Remains 4 $\frac{6}{8}$

To know which of any two or more *Fractions* is greatest.

Reduce them to the same Denomination, and then those that have the greatest *Numerators* are the greatest *Fractions*.

MULTIPLICATION.

If the *Fractions* are to be multiplied by single *Fractions*, then multiply the *Numerators* one into another, and set that *Product* for a new *Numerator*, also multiply the *Denominators* one into another for a new *Denominator*, the new *Fraction* gives the *Product*.

E X A M P L E

Multiply $\frac{2}{5}$ by $\frac{3}{4}$. Answer $\frac{6}{20}$ or $\frac{3}{10}$.

Also $\frac{2}{5}$ of $\frac{3}{4}$ and $\frac{3}{4}$ multiplied, continually make $\frac{6}{20}$ or $\frac{3}{10}$

If the *Numbers* be mixt *Numbers*, or whole *Numbers* and *Fractions*, reduce them into single *Fractions*, and then multiply them as is taught.

15

2

Multiply $\frac{3}{5}$ of $\frac{5}{6}$ by $\frac{1}{2}$ of $\frac{2}{3}$

$\frac{30}{3} - \frac{1}{6} = \frac{2}{6}$

180

Or this Way

$\frac{15}{5} - \frac{5}{6} = \frac{1}{2}$

$\frac{2}{6} - \frac{1}{3} = \frac{1}{6}$

$\frac{30}{180} - \frac{15}{180} - \frac{5}{180} = \frac{1}{6}$ Answer.

$\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$ Answer.

Multiply

Multiply 5 by $\frac{4}{5}$

$$\begin{array}{r} 20 \\ \frac{5}{1} - \frac{4}{5} \\ 5 \end{array}$$

5)20(4 Answer.

$$\begin{array}{r} 20 \\ \underline{20} \\ 00 \end{array}$$

Multiply 3 and $\frac{2}{4}$ by 6

$$\begin{array}{r} 3 \frac{2}{4} \\ 4 \\ \hline 14 \\ 4 \end{array}$$

$$\begin{array}{r} 84 \\ \frac{14}{4} - \frac{6}{1} \\ 4 \end{array}$$

4)84(21 Answer.

$$\begin{array}{r} 84 \\ \underline{84} \\ 04 \\ \underline{04} \\ 0 \end{array}$$

Multiply 3 and $\frac{1}{4}$ by 2 and the $\frac{1}{3}$.

$$\begin{array}{r} 3 \frac{1}{4} \\ 4 \\ \hline 13 \\ 4 \end{array}$$

$$\begin{array}{r} 2 \frac{1}{3} \\ 3 \\ \hline 7 \\ 3 \end{array}$$

$$\begin{array}{r} 91 \\ \frac{13}{4} - \frac{7}{3} \\ 12 \end{array}$$

12)91($7\frac{7}{12}$ Answer.

$$\begin{array}{r} 84 \\ \underline{84} \\ 7 \\ \underline{7} \\ 12 \end{array}$$

DIVISION.

If the Numbers given be single *Fractions*, then multiply the *Numerator* of the *Dividend* into the *Denominator* of the *Divisor*, the *Product* is a new *Numerator*; also multiply the *Denominator* of the *Dividend* into the *Numerator* of the *Divisor*, the *Product* is a new *Denominator*, the *Fraction* is the *Quotient*.

EXAMPLE

Of Fractions.

67

EXAMPLE.

Divide $\frac{2}{3}$ by $\frac{1}{5}$

$$\begin{array}{r} 10. \\ \frac{2}{3} - \frac{1}{5} \text{ Quotient } \frac{10}{3}. \\ 3 \end{array}$$

I demand the Quotient of $\frac{3}{4}$ by $\frac{2}{5}$.

$$\begin{array}{r} 18 \\ \frac{3}{4} - \frac{2}{5} \text{ Quotient } \frac{18}{8} \text{ or } 2 \text{ Integers } \frac{2}{8}. \end{array}$$

I demand the Quotient of $\frac{11}{12}$ by $\frac{1}{2}$.

$$\begin{array}{r} 22 \\ \frac{11}{12} - \frac{1}{2} \\ 12 \end{array} \quad \begin{array}{l} \text{Inte.} \\ 12)22(1 \frac{10}{12} \text{ or } \frac{5}{6} \text{ of an Integer.} \\ 12 \\ \hline 10 \\ \frac{10}{12} \end{array}$$

To divide whole Numbers and Fractions.

I demand the Quotient of 54 by $\frac{3}{7}$.

$$\begin{array}{r} 378 \\ 54 - \frac{3}{7} \\ 3 \end{array}$$

$$\begin{array}{r} \text{Inte.} \\ 3)878(126 \text{ Quotient.} \\ 3 \\ \hline 07 \\ 6 \\ \hline 18 \\ 18 \\ \hline 0 \end{array}$$

Divide

Divide $2 \frac{2}{3}$ by $1 \frac{1}{5}$.

$$\begin{array}{r} \overset{l.}{2} \frac{2}{3} \\ \hline \frac{8}{3} \end{array}$$

$$\begin{array}{r} \overset{l.}{1} \frac{1}{5} \\ \hline \frac{6}{5} \end{array}$$

$$\begin{array}{r} 40 \\ \frac{8}{3} - \frac{6}{5} \\ \hline 18 \end{array}$$

$\frac{40}{18}$ Quotient

$$18 \overline{) 40} \left(2 \frac{4}{9} \right. \text{ or } \frac{2}{9} \text{ of } \frac{40}{1} s.$$

$$\begin{array}{r} 36 \\ \hline \frac{4}{9} \end{array}$$

$$9 \overline{) 40} (4 \text{ Shillings.}$$

$$\begin{array}{r} 36 \\ \hline 48 \end{array}$$

$\frac{4}{9}$ of $\frac{12}{1}$ Pence.

$$9 \overline{) 48} (5 \text{ Pence.}$$

$$\begin{array}{r} 45 \\ \hline 12 \end{array}$$

$\frac{3}{9}$ of $\frac{4}{1}$ Farthing

$$9 \overline{) 12} (1 \text{ Farth}$$

$$\begin{array}{r} 9 \\ \hline \end{array}$$

So that I find $2 \frac{2}{3}$ divided by $1 \frac{1}{5}$, the Quotient comes to $2 \frac{4}{9}$ s. 5 d. $\frac{4}{9}$ of a Farthing. See the Work.

$\frac{3}{9}$ of a Far

To divide Fractions of Fractions.

Divide $\frac{2}{3}$ of $\frac{3}{4}$ by $\frac{2}{8}$ of $\frac{2}{10}$.

$$\begin{array}{r} \frac{2}{3} \text{ of } \frac{3}{4} \\ \hline 12 \end{array}$$

$$\begin{array}{r} \frac{2}{8} \text{ of } \frac{2}{10} \\ \hline 80 \end{array}$$

$$\begin{array}{r} 480 \\ \frac{6}{12} - \frac{18}{80} \\ \hline 216 \end{array}$$

$\frac{480}{216}$ Quo

$$\begin{array}{r} \text{Int.} \\ 216 \overline{) 480} (2 \frac{48}{216} \\ \underline{432} \\ 48 \end{array}$$

CHAP

C H A P. VIII.

The Rule of T H R E E Direct.

SO called, because in it there are Three Numbers given to find a Fourth, It is also called the *Golden Rule*, because of its frequent and most excellent Use; and therefore for the working thereof, mark well this

General Rule.

Note, That you bring your First and Third Numbers into One Denomination or Name, and your Middle Number into the lowest Name mentioned. Then multiply your Second Number under your Third, and divide that *Product* by the First, and the *Quotient* will answer the Question in such a Denomination or Name, as you left your Middle Number in.

That is, if your Middle Number is *Pounds*, your *Quotient* will be *Pounds*; if your Middle Number is *Shillings*, your *Quotient* will be *Shillings*; if your Middle Number is *Pence*, your *Quotient* will be *Pence*; if your Middle Number is *Farthings*, your *Quotient* will be *Farthings*, &c.

If

70 The Rule of Three Direct.

If 8 Yards of Cloth cost 4 l. 10 s. 8 d. what will
24 Yards cost ?

<i>Yards</i>	<i>l.</i>	<i>s.</i>	<i>d.</i>		<i>Yards</i>
If 8 cost	4	10	8	what will	24 cost.
		20	<i>Shil.</i>	Multiply by	1088
					Second
					Num
		90	<i>Shillings.</i>		192
		12	<i>Pence.</i>		192
					240
		1088	<i>Pence.</i>		

Divide by 26112
8 First Num

<i>Rds.</i>	<i>l.</i>	<i>s.</i>		<i>Rds.</i>	
If 24 cost	13	12	what will	8 cost.	3264 <i>Pence.</i>
		20	<i>Shillings.</i>		12 <i>Pence.</i>
		272			27 2 <i>Shil.</i>
		12			2 0 <i>Shil.</i>
		3264		Answer	13-12
		8			

24) 26112 (1088

24	12
211	9 0 - 8
192	2 0

192 4-10-8 Proof.

192

0

So that 24 Yards will come to 13 l. 12 s.
the Work.

The Rule of Three Direct.

71

If 6 Ounces of Cinnamon cost 2 s. 8 d. what will 16 lb. 8 oz. cost.

oz.	s. d.	lb oz.
If 6 cost	2 — 8	16 — 8
	12 Pence.	16 Ounces.
	32 Pence.	104
		16

264 Ounces.

Multiply by 32 Second Number.

528

792

8448

Divide by 6 the First Number.

1408 Pence.

12 Pence.

117 — 4 d.

20

Answ. 5 — 17 — 4 d.

So that 16 lb. 8 oz. will cost 5 l. 17 s. 4 d. See the Work.

If

If 1 Pound of Tobacco cost 1 s. 8 d. what will
4 C. $\frac{3}{4}$ 16 lb. cost.

lb	s.	d.	C.	lb.
If 1 cost	1	8	4	$\frac{3}{4}$ 16
		12 Pence.		4 Quarters.

20

19 Quarters.
28 Pounds.

158

39

Multiply by 548 Pounds weight.
20 Second Number.

10960 Pence.

12 Pence.

91 | 3-4
2 | 0

Anf. 45-13-4

So that 4 C. $\frac{3}{4}$ 16 lb. at 20 d. per Pound, comes
to 45 l. 13 s. 4 d. See the Work.

The Rule of Three Direct.

73

If 1 Bushel of Coals cost 11 d. what will 16 Chal-
dron, each 36 Bushels, cost?

Bushel	d.	Chaldron	Bushels.
If 1 cost	11	16 each	36
	4 Farthings	36	Bushels.
	44 Farthings.	96	
		48	
		576 Bushels.	
		44 Second Numb.	
		2304	
		2304	
		25344	
		4 Farthings.	
		6336 Pence.	
		12 Pence.	
		528 Shillings.	
		20	
Answer		26-8 s.	

E

If 3

If 3 Ounces of *Plate* be worth 15 s. 9 d. w
will 54 Ounces be worth ?

oz.	s.	d.	oz.
If 3 cost	15	9	54 cost.
	12	Pence.	189 Second Num

<u>189</u>	<u>486</u> 432 54
------------	-------------------------

10206

Divide by 3 the First Num

3402 Pence.
12 Pence.

28 | 3-6
2 | 0 Shillings.

L. 14-3-6

So that 54 Ounces comes to 14 l. 3 s. 6 d.
the Work.

The Rule of Three Direct.

7

If 12 lb. of Currants cost 6 s. 6 d. what will
48 Frails, each $\frac{3}{4}$ 16 lb. cost ?

lb	s.	d.	Frails	lb
If 12 cost	6	6	48 each	$\frac{3}{4}$ 16
	12	Pence.		28 Pounds in 1 Quarter
	78	Pence.		30
				7

100 Pounds in one Frail.
48 Frails.

800
400

4800 lb in all the Frails.
78 Second Number.

38400
33600

374400
Divide by 12 the First Number.

31200 Pence.
12 Pence.

2600 Shillings.
200 Skill.

130

So that 48 Frails, each $\frac{3}{4}$ 16 lb wt. comes to 130 l.

E 2

If 8

76 *The Rule of Three Direct.*

If 8 Pair of *Stockings* cost 48 *Shillings*, what will
120 Dozen Pair cost.

<i>Pair</i>	<i>s.</i>	<i>Dozen</i>
If 8 cost	48	120 Pair cost
		12 Pair in one Dozen.

1440 Pair in all.
48 *Shil.* Second Num

11520
5760

69120
Divide by 8 the First Number.

864 | 0 *Shillings.*
2 | 0

432 *l.*

So that 120 Dozen Pair of *Stockings* at 6 *Shillings*
per Pair, comes to 432 *Pounds*.

Bou

The Rule of Three Direct.

77

W Bought 10 Packs of Cloth, each Pack containing
6 Cloths, and each Cloth 27 Yards at 7 s. 9 d. per
Yard. I demand how much it comes to in all?

10 Packs.

26 Cloths in 1 Pack.

60

20

260 Cloths in all.

27 Yards in 1 Cloth.

1820

520

er. Yard 1 cost $\frac{s.}{7-9}$ 7020 Yards in all.

12 Pence.

93

93 Pence.

21060

63180

652860 Pence.

12 Pence.

5440 | 5 Shillings.

2 | 0 Shillings.

Answer 2720—5 s.

E 3

Yards

Proof.

<i>Yards</i>	<i>l.</i>	<i>s.</i>	<i>Yard.</i>
If 7020 cost	27	20	1 cost.
		20	

Shillings.

54405 Shillings.
12 Pence.

7020)652860 (93 Pence.
63180 (12 Pence.

21060 7 s. 9 d. the Price of
21060 ——— one Yard.

00

Bought

The Rule of Three Direct.

79

Bought of several Persons 650 C. $\frac{3}{4}$ 10 lb. of Currants at 4 d. $\frac{3}{4}$ per Pound, to whom I have sold 909 C. $\frac{1}{4}$ 16 lb. of Sugar at 4 d. $\frac{1}{4}$ per Pound. I desire to know what remains for me to pay, they having taken the Sugar in part of Payment?

lb	d.	C.	lb
650	4 $\frac{3}{4}$	909	4 $\frac{1}{4}$
	4 Farthings.		4 Quarters.
19	Farthings.	2603	Quarters.
		28	Pounds.
		20824	
		5207	
		72894	Pounds.
		19	Second Number.
		656046	
		72894	
		1384986	Farthings.
		4	
		346246	$\frac{1}{2}$ Pence.
		12	
		2885	3-10
		2	0
Answer		1442	13-10 $\frac{1}{2}$

The Rule of Three Direct,

$$\begin{array}{rclcl} \text{lb} & & d. & & C. & & \text{lb} \\ \text{If } 1 & \text{---} & 4 & \text{---} & 709 & \text{---} & 16 \\ & & \frac{1}{4} & & \frac{1}{4} & & \\ & & 4 \text{ Farthings.} & & 4 \text{ Quarters.} & & \end{array}$$

$$\begin{array}{rcl} & 17 \text{ Farthings.} & \\ & 2837 \text{ Quarters.} & \\ & 28 \text{ Pounds.} & \end{array}$$

22702

5675

79452 Pounds.

17 Second Number.

556164

79452

1350684 Farthings.

4

337671 Pence.

12 1

$$\begin{array}{rcl} l. & s. & d. \\ 1442 & --13-- & 10 \frac{1}{2} \\ 1406 & --19-- & 3 \end{array}$$

2813 | 9-3

2 | 0

Ans. 1406-19-3 d.

To pay 35--14--7 $\frac{1}{2}$

A Gentleman spends 1 l. 6 s. 8 d. a Day, and lays up at the Year's end 598 l. to purchase withal, I demand what his Yearly Income amounts to?

Answer, 1084 l. 13 s. 4.

A Ship sailed 48 Leagues in 24 Hours, how many Leagues will she sail in a Week with the like Wind?

Answer, 336 Leagues.

If

The Rule of Three Direct.

81

If 8 lb. of Pepper cost 4 s. 8 d. what will 7 C. $\frac{3}{4}$ lb. cost? Answer, 25 l. 14 s. 6 d.

If 1 lb. of Gauls cost 15 d. how many Hundred-weight shall I have for 122 l. 10 s. 8 d.

Answer, 17 C. $\frac{1}{2}$.

By our Factor's Account out of *Barbadoes* there is made of the Neat-Sail of 120 Dozen of Shoes 89 C. $\frac{1}{2}$ 21 lb, of Sugar, I demand how much of the Sugar my Partner is to have for 74 Dozen, which was his?

Answer, 55 C. $\frac{1}{4}$ 6 lb.

ber. A Gentleman sold a Lease of a Parcel of old Houses of 175 l. 12 s. per Annum for 12 Years $\frac{1}{2}$ Purchase, what will the Purchase-Money amount to?

Answer 2195 l.

A Draper sold 36 Cloths for 432 l. 16 s. 6 d. by which he gained as much as one stood him in, I demand the Price of one Cloth?

Answer, 12 l. 0 s. 5 d. $\frac{1}{3}$.

A Merchant paid 496 l. 13 s. 11 d. for a Parcel of Cloth, and when he had computed it, found that an Ell *Flemish* cost him 2 s. 6 d. what Quantity had he for his Money at that Rate.

Answer, 3973 Ells, $\frac{1}{3}$.

A Captain had 2889 l. 10 s. 8 d. to maintain a certain Number of Soldiers, how many will it maintain for 2 Years, 11 Months, 17 Days, allowing each Man 7 d. $\frac{1}{2}$ per Day?

Answer, 87 Men, $\frac{2}{3}$.

lays
I de. A Merchant delivered at London 120 l. Sterling to receive 207 l. *Flemish* at Rotterdam, what was 1 l. Sterling valued at in *Flemish* Money?

Answer 1 l. 14 s. 6 d.

s. 4.
many
ind?
gues.
If A Seaman sailed in a Man of War from the 20th of November 1704. to the 20th of April 1708. what comes his Wages to at 1 l. 8 s. 6 d. per Month?

Answer 62 l. 14 s.

E 5

If

If a Piece of Ordnance shoot 14 lb. $\frac{3}{4}$ of Powder at a Time, how many Pounds will discharge the same 68 Times, and what comes the Powder to at 11 d. $\frac{1}{4}$ per Pound?

Answer, $\left\{ \begin{array}{l} 1003 \text{ Pounds of Powder.} \\ \text{comes to } 47 \text{ l. } 0 \text{ s. } 3 \text{ d. } \frac{3}{4} \end{array} \right.$

A Draper lays out 120 l. the $\frac{1}{3}$ of it in Callicoes at 20 s. 5 d. per Piece, the $\frac{1}{3}$ in Cambricks at 32 s. 9 d. per Piece, and the rest in Holland at 5 s. 9 d. per Ell. I desire to know how much he had of each Sort?

Answer, $\left\{ \begin{array}{l} \text{Callicoes } 39 \text{ Pieces } \frac{45}{245} \text{ of a Piece.} \\ \text{Cambricks } 24 \text{ Pieces } \frac{168}{393} \text{ of a Piece.} \\ \text{Holland } 139 \text{ Ells } \frac{89}{89} \text{ of an Ell.} \end{array} \right.$

A Draper bought 120 Yards of Holland Cloth for which he gave 31 l. I desire to know how he must sell it per Yard, to gain 10 l. 6 s. 8 d. in the whole Sale of 120 Yards?

Answer, 6 s. 10 d.

A Butcher bought an Ox (which weighed besides Skin and Legs 108 Stone) for 10 l. 10 s. There was in him 8 Stone $\frac{1}{2}$ of Tallow, which he sold for 4 d. $\frac{3}{4}$ per Pound. The Skin and Legs he sold for 1 l. 5 s. 9 d. How much does one Stone of this Beef stand him in?

Answer, 18 d. $\frac{3}{4}$ $\frac{71}{72}$

A Plummer bought 268 Fodder of Lead each weighing 19 C. $\frac{1}{4}$ 20 lb. at 1 d. $\frac{1}{4}$ per Pound, I demand what the whole Quantity cost him?

Answer, 3037 l. 6 s. 8 d.

A. and B. barter; A. hath 265 Pipes of Wine at 25 l. per Pipe, for which B. giveth him in ready Money 879 l. and the rest in Casks at 7 s. 9 d. per Cask; demand how many Casks he must have besides the ready Money?

Answer 15322 Casks,

The Rule of Three Inverse. 83

A Merchant took into his Hands of an Orphans Estate 1421 *l.* 16 *s.* 8 *d.* which he kept 13 Years, and at the End thereof he returned Principal and Interest upon Accompt and in Money 2319 *l.* 12 *s.* 6 *d.* I demand what Rate he allowed *per Cent. per Annum*, reckoning only Simple Interest?

Answer, 4 *l.* 17 *s.* 1 *d.*

A Merchant bought 30 Pieces of Broad-Cloth, each Piece containing 32 Yards $\frac{1}{2}$, at 12 *s.* 6 *d.* $\frac{1}{2}$ *per Yard*; I demand how much he paid for the whole; and if he sell it again for 16 *s.* 8 *d.* *per Yard*, how much will he gain by the Bargain, and how much upon every 100 *l.* of Money?

A Merchant departed with an Estate from London to Venice, and there gained 25 *Dollars per Cent.* and spent of his neat Gains 1864 *Dollars*; and when he had ballanced his Accompts, found he had remaining 38679 *Dollars*, I demand what he carried with him?

Answer, 29010 *Dollars*.

A Merchant shipp'd for Spain 364 Pieces of Broad-Cloth, each Piece containing 54 Yards at 8 *s.* 6 *s.* *per Yard*, and had returned from thence 5694 *Tuns* of Malaga Sack at 11 *d.* $\frac{1}{4}$ *per Pint*, but by tempestuousness of the Weather, the Marriners were forced to cast over-board 488 *Tuns*, 2 *Hogsheads*, the Question is, whether did the Merchant gain or lose, and how much?

Answer, 483565 *l.* 19 *s.*

NOTE, *Arithmeticians* generally distinguish the Rule of Three into two Rules, one they call *Direct*, and the other the *Inverse Rule of Three*, which Distinction is nothing else but this: If the Number which is in the First Place, is of the same Name with that which asketh the Question be the *Divisor*, then it is the Rule of Three *Direct*; but if the Third Number

84 *The Rule of Three Inverse.*

Number asketh the Question be the *Divisor*, then is the *Rule of Three Inverse*.

There are 2400 Solders in Garrison in a City besieged, and have Provision to serve them 9 Months the Question is how many must be disbanded that the Provision may serve 16 Months?

<i>Months.</i>		<i>Soldiers.</i>		<i>Months.</i>
If 9	-----	2400	-----	16
		9 First Number.		

Third Number 16) 21600 (1350 Men.
16 ..

56	
48	
80	2400
80	1350
00	1050

So that you see the Provision will serve 1350 Men 16 Months, therefore the rest must be disbanded to the Number of 1050, as is found by subtracting 1350 from 2400.

If a Man lend his Friend 350 l. for 365 Days how long Time ought his Friend to lend him 240 to requite his Courtesie?

Answer, 532 Days $\frac{2}{2}$

C H A

C H A P. IX.

*Rules of PRACTICE with very plain
and easie TABLES.*

It is necessary that the Learner before he proceed,
have by Heart these following Tables ; viz.

d.	s.	d.
20 is	1—	8
30	2—	6
40	3—	4
50	4—	2
60	5—	0
70	5—	10
80	6—	8
90	7—	6
100	8—	4
110	9—	2
120	10—	0
130	10—	10
140	11—	8
150	12—	6
160	13—	4
170	14—	2
180	15—	0
190	15—	10
200	16—	8
210	17—	6
220	18—	4
230	19—	2
240	20—	0

s.	d.
1 is	12
2	24
3	36
4	48
5	60
6	72
7	84
8	96
9	108
10	120
11	132
12	144
13	156
14	168
15	180
16	192
17	204
18	216
19	228
20	240

The even Parts of a Pound.

s.	d.
10—0 is	$\frac{1}{2}$
6—8	$\frac{1}{4}$
5—0	$\frac{1}{4}$
4—0	$\frac{1}{4}$
3—4	$\frac{1}{8}$
2—6	$\frac{1}{8}$
2—0	$\frac{1}{8}$
1—8	$\frac{1}{8}$
1—0	$\frac{1}{8}$

The even Pts of a Shilling.

d.		
6	is	$\frac{1}{2}$
4		$\frac{1}{4}$
3		$\frac{1}{4}$
2		$\frac{1}{4}$
1	$\frac{1}{2}$	$\frac{1}{8}$
1		$\frac{1}{8}$
		$\frac{1}{2}$

NOTE,



O T E, That when the Price of 1 or an Integer is an even Part of a Pound, divide the Integers whose Price are required by the Denominator of that even Part, the Quotient will be the Price of the Integers.

If the Price of 1 Integer is an equal Part of a Pound, your Quotient will be Pounds; if the Price of an Integer is an equal Part of a Shilling, the Quotient will be Shillings, &c.

And observe always, that when any Thing remains after Division, it is of the same Denomination or Name as the Dividend was.

E X A M P L E S.

$\frac{1}{2}$ Ells d.
67486 at 6 per Ell.

3374 | 3 Shillings.
2 | 0

1687—3

So that 67486 Ells comes to at 6 d. per Ell, One thousand six hundred eighty-seven Pounds, Three Shillings.

$\frac{1}{3}$ Yards d.
7846 at 4 per Yard.

261 | 5—4 Pence.
2 | 0

£. 130—15—4

$\frac{1}{4}$ lb d.
2768 at 3 per Pound.

69 | 2
2 | 0

34—12

$\frac{1}{6}$ Yards d.
3618 at 2 per Yard.

60 | 3
2 | 0

30—3

Rules of Practice.

87

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ion

Ells	d.
2760 at	$1 - \frac{1}{2}$ per Ell.
34 5	
2 0	
17—5	

Quarts	d.
$\frac{1}{12}$ 4896 at	1 per Quart.
40 8	
2 0	
20—8	

Having shewn you the Even Parts of a Shilling, I shall now begin with a Farthing, Halfpenny, Three-farthings, &c.

Ells.	
$\frac{1}{4}$ 6936 at $\frac{1}{4}$ per Ell.	
1734 Pence.	
12	
14 4—6	
2 0	
7—4—6	

Yards	
$\frac{1}{2}$ 716 at $\frac{1}{2}$ per Yard.	
358 Pence.	
12	
2 9—10	
2 0	
1—9—10	

Observe always, That when the Price of any one Thing is a Farthing, or Pence and Farthings, the given Number or Top-Line must be Farthings.

$$\begin{array}{r}
 \text{lb} \\
 \frac{1}{2} \quad 7467 \text{ at } \frac{3}{4} \text{ per Pound.} \\
 \hline
 \frac{1}{2} \quad 3733 - \frac{1}{2} \\
 1866 - \frac{3}{4} \\
 \hline
 5600 - \frac{1}{4} \\
 12 \\
 \hline
 46 \overline{) 6-8} \\
 2 \mid 0 \\
 \hline
 23-6-8-\frac{1}{4}
 \end{array}$$

The Proof by the Rule of Three.

$ \begin{array}{r} \text{lb} \\ \text{If } 1 \text{ --- } \frac{3}{4} \text{ --- } \end{array} $	$ \begin{array}{r} \text{lb} \\ 7467 \\ 3 \\ \hline 22401 \\ 4 \\ \hline 5600-1 \\ 12 \\ \hline 46 \overline{) 6-8} \\ 2 \mid 0 \\ \hline 23-6-8 \end{array} $
---	---

The Manner of the working the foregoing Question.

The given Number is 7467 lb. at 3 Farthings. First I say 2 Farthings is half of a Penny, and divide it in the Top-line, and the Product is so many Pence, and there

there remains a *Halfpenny* ; then I say, a *Farthing* is the half of a *Halfpenny*, and divide it in the *Pence*, and there remains 2 *Farthings* and half the remaining *Halfpenny* above, and it makes 3 *Farthings* ; then draw a Line and add both the *Products* together and work as before, and when the Work is finished, you find that 7467 Pounds weight comes to at 3 *Farthings* per Pound, Twenty-three Pounds Six Shillings and Eight Pence *Farthing*.

<i>Yards</i> <i>d.</i>	<i>Ounces</i> <i>d.</i>
$\frac{1}{2}$ 5978 at $1 \frac{1}{4}$ per Yard.	$\frac{1}{8}$ 7225 at $1 \frac{3}{4}$ per Ounce.
$\frac{1}{4}$ 498—2 <i>d.</i> 124—6— $\frac{1}{2}$	$\frac{1}{6}$ 903—1— $\frac{1}{2}$ 150—6— $\frac{1}{4}$
62 2—8— $\frac{1}{2}$ 2 0	105 3—7— $\frac{3}{4}$ 2 0
31—2—8— $\frac{1}{2}$	52—13—7— $\frac{3}{4}$

For the working of one *Penny Farthing*, I say 1 *d.* the $\frac{1}{12}$ of a *Shilling*, and there remains 2 *Pence* ; then I say, a *Farthing* is the $\frac{1}{4}$ of a *Penny*, and work in the Bottom Line of *Shillings*, and there remains *Pence*, and the 4th Part of 2 *Pence* is a *Halfpenny*, then add the two Lines up, and the *Product* is *Shillings* ; and in Case of any other Sum with *Farthings*, you must work as is above taught, that is, your ten Parts of a *Shilling* first, and your *Farthings* in your Parts.

Ounces d.
 $\frac{1}{6}$ 864 at $2 - \frac{1}{4}$ per Ounce.

$$\begin{array}{r} \frac{1}{8} \quad 144 \\ \quad 18 \\ \hline 16 \mid 2 \\ \quad 2 \mid 0 \\ \hline 8 - 2 \end{array}$$

Yards d.
 $\frac{1}{6}$ 478 at $2 - \frac{3}{4}$ per Yard.

$$\begin{array}{r} \frac{1}{4} \quad 79 - 8 \\ \frac{1}{2} \quad 19 - 11 \\ \quad 9 - 11 - \frac{1}{2} \\ \hline 10 \mid 9 - 06 - \frac{1}{2} \\ \quad 2 \mid 0 \\ \hline 5 - 9 - 06 - \frac{1}{2} \end{array}$$

Bags d.
 $\frac{1}{6}$ 3789 at $2 - \frac{1}{2}$ per Bag.

$$\begin{array}{r} \frac{1}{4} \quad 631 - 6 \\ \quad 157 - 10 - \frac{1}{2} \\ \hline 78 \mid 9 - 04 - \frac{1}{2} \\ \quad 2 \mid 0 \\ \hline 39 - 9 - 04 - \frac{1}{2} \end{array}$$

Ells d.
 $\frac{1}{4}$ 7896 at $3 - \frac{1}{4}$ per Ell.

$$\begin{array}{r} \frac{1}{2} \quad 1974 \\ \quad 164 - 6 \\ \hline 213 \mid 8 - 6 \\ \quad 2 \mid 0 \\ \hline 106 - 18 - 6 \end{array}$$

lb d.
 $\frac{1}{4}$ 78964 at $3 - \frac{1}{2}$ per lb.

$$\begin{array}{r} \frac{1}{8} \quad 19741 \\ \quad 3290 - 2 \\ \hline 2303 \mid 1 - 2 \\ \quad 2 \mid 0 \\ \hline 1151 - 11 - 2 \end{array}$$

Yards d.
 $\frac{1}{4}$ 7834 at $3 - \frac{3}{4}$ per Yard.

$$\begin{array}{r} \frac{1}{4} \quad 1958 - 6 \\ \quad 489 - 7 - \frac{1}{2} \\ \hline 244 \mid 8 - 1 - \frac{1}{2} \\ \quad 2 \mid 0 \\ \hline 122 - 8 - 1 - \frac{1}{2} \end{array}$$

To w
 ing tw
 therw
 must ha

Ounc
 5973

199
 248

223
 2

811-

To w
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Ounc

Rules of Practice.

91

Ounces d.
 $\frac{1}{8} \frac{1}{8}$ 7896 at $4-\frac{1}{4}$ per Ounce.

$$\begin{array}{r}
 1316 \\
 \frac{1}{8} 1316 \\
 164 - 6 \\
 \hline
 279 \overline{) 6-8} \\
 2 \quad \overline{) 0} \\
 \hline
 139-16-6
 \end{array}$$

To work this Sum, I say 2 Pence is the $\frac{1}{6}$ of a Shilling twice, that I may take Parts for a Farthing, otherwise it would have been the $\frac{1}{12}$ of a Groat, and must have caused a great deal more Work.

Ounces d.
 5973 at $4-\frac{1}{2}$ per Ounce

Pots d.
 $\frac{1}{3}$ 971 at $4-\frac{3}{4}$ per Pot.

$$\begin{array}{r}
 1991 \\
 248 - 10 - \frac{1}{2}
 \end{array}$$

$$\begin{array}{r}
 \frac{1}{2} \frac{1}{2} 323 - 8 d. \\
 40 - 5 - \frac{1}{2} \\
 20 - 2 - \frac{3}{4}
 \end{array}$$

$$\begin{array}{r}
 223 \overline{) 9-10-\frac{1}{2}} \\
 2 \quad \overline{) 0}
 \end{array}$$

$$\begin{array}{r}
 38 \overline{) 4-4-\frac{1}{4}} \\
 2 \quad \overline{) 0}
 \end{array}$$

$$\begin{array}{r}
 811-19--10--\frac{1}{2}
 \end{array}$$

$$\begin{array}{r}
 19-4--4--\frac{1}{4}
 \end{array}$$

To work this Sum and all others of this Nature, you must take your Parts in your Parts: First, I say Pence is the $\frac{1}{3}$ Part of a Shilling, and the Product is Shillings; then I say a Halfpenny is the $\frac{1}{8}$ of Four Pence, and work it in the Product Shillings; then I say a Farthing is the half of a Half-penny, and the work stands above, which is a much shorter Way than the

Rule

Rule of Three; and the Rule of Three is the only Proof as has been shewn before.

$\frac{1}{3}$ Yards d.
712 at 5 per Yard.

$\frac{1}{4}$ 237-4 d.
59-4

29|6-8
2|0

14-16-8

Ounces d.
 $\frac{2}{3}$ 3716 at $5-\frac{1}{4}$ per Oz.

$\frac{1}{4}$ 1238-8
309-8
77-5

162|5-9
2|0

81-5-9

Ells d.
 $\frac{1}{3}$ 8796 at $5-\frac{1}{2}$ per Ell.

$\frac{1}{4}$ 2932
733
366-6

203|1-6 d.
2|0

101-11-6

Ounces d.
 $\frac{1}{3}$ 6371 at $5-\frac{3}{4}$ per Ounce.

$\frac{1}{4}$ 2123-8
 $\frac{1}{2}$ 530-11
 $\frac{1}{2}$ 265-5- $\frac{1}{2}$

132-8- $\frac{3}{4}$

305|2-9- $\frac{1}{4}$!
2|0

152-12-9- $\frac{1}{4}$

Yards d.
 $\frac{1}{3}$ 4687 at $6-\frac{1}{4}$ per Yard.

$\frac{1}{2}$ 1562-4
 $\frac{1}{8}$ 781-2
97-7- $\frac{3}{4}$

244|1-1- $\frac{3}{4}$
2|0

122-1-1- $\frac{3}{4}$

Ounces d.
 $\frac{1}{2}$ 986 at $7-\frac{1}{2}$ per Ounce.

$\frac{1}{4}$ 493
123-3

61|6-3
2|0

30-16-3

Quart

Rules of Practice.

93

$\frac{1}{2}$ Quarts. d.
9864 at 8— $\frac{1}{4}$ per Qrt.

$\frac{1}{3}$ $\frac{1}{8}$
4932
1644
205—6
678 | 1—6
2 | 0

339-1-6

$\frac{1}{2}$ Yards d.
642 at 9— $\frac{3}{4}$ per Yard.

$\frac{1}{2}$ $\frac{3}{4}$
321
160—6
40—-1— $\frac{1}{2}$

52 | 1—7— $\frac{1}{2}$
2 | 0

26-1-7— $\frac{1}{2}$

$\frac{1}{3}$ Ounces d.
9374 at 10— $\frac{1}{2}$ per Oz.

$\frac{1}{3}$ $\frac{1}{8}$
4687
2343—6
1171—9

820 | 2—3
2 | 0

410-2-3

lb d.
 $\frac{1}{3}$ $\frac{1}{3}$ 9864 at 11— $\frac{3}{4}$ per lb.

$\frac{5}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
3288
3288
1644
822
411
205—6

965 8—6
2 | 0

482-18-6

Ells d.
 $\frac{1}{2}$ 7897 at 12— $\frac{1}{4}$ per Ell.

$\frac{1}{2}$ $\frac{1}{2}$
3948—6
1974—3
 $\frac{1}{12}$ 1974—3
164—6— $\frac{1}{4}$

806 1—6— $\frac{1}{4}$
2 | 0

403-1-6— $\frac{1}{4}$

9876 Ounces at 13 d. $\frac{1}{4}$
per Ounce.

Answer 545 l. 4 s. 9 d.
7897 Yards at 1 s. 2 d. $\frac{3}{4}$
per Yard.

Answ. 485 l. 6 s. 8 d. $\frac{1}{2}$

7986

7986 Quarts at 1 s. 3 d. $\frac{3}{4}$
per Quart.

Answ. 524 l. 1 s. 7 d. $\frac{1}{2}$

7579 Ells at 4 s. 4 d. $\frac{1}{4}$
per Ell.

6497 Yards at 5 s. 4 d. $\frac{1}{2}$
per Yard.

7986 Ells at 2 s. 3 d. $\frac{1}{2}$
per Ell.

Note, That you multiply your two Shillings under the given Number, and take the Parts for your three Pence in the

upper Line. Observe the following Question

Yards s. d.

$\frac{1}{4}$ 7856 at 3-3- $\frac{3}{4}$ p. Yd.

3

23568

$\frac{1}{4}$ 1964

491

2602 | 3

2 | 0

1301-3

lb l. s. d.
 $\frac{1}{4} \frac{1}{4}$ 98764 at 1-7-6- $\frac{1}{4}$ per lb.
27 20

691348

27 Shillings

197528

2666628

24691

$\frac{1}{12}$ 24691

2057--7 d.

271806 | 7-7

2 | 0

135903-7-7

The Proof.

lb	l.	s.	d.	lb
If 1	1	7	6 - $\frac{1}{4}$	98764
	20			1321
	27			98764
	12			197528
	330			296292
	4			98764
	1321			130467244
				4
				32616811
				12
				271806 7-7
				2 0
				135903--7--7

87398 Ounces at 2 l. 5 s. 7 d. $\frac{3}{4}$ per Ounce.

Answer 191251 l. 9 s. 6 d. $\frac{1}{2}$.

7586 Butts at 3 l. 10 s. 9 d. $\frac{1}{2}$ per Butt.

Answer 26851 l. 5 s. 7 d.

8379 Hogsheads at 4 l. 6 s. 8 d. $\frac{1}{4}$ per Hogshead.

Answer, 32834 l. 14 s. 5 d. $\frac{1}{2}$.

The Even Parts of a Tun.

$$\left\{ \begin{array}{l} \text{C. qrs} \\ 10-0 \\ 5-0 \\ 4-0 \\ 2-2 \\ 2-0 \end{array} \right\} \text{ is the } \left\{ \begin{array}{l} \frac{1}{2} \\ \frac{1}{4} \\ \frac{1}{8} \\ \frac{1}{16} \\ \frac{1}{32} \\ \frac{1}{64} \end{array} \right\}$$

The Even Parts of a Hundred-weight.

$$\left\{ \begin{array}{l} \text{lb} \\ 16 \\ 14 \end{array} \right\} \text{ is the } \left\{ \begin{array}{l} \frac{1}{2} \\ \frac{1}{4} \\ \frac{1}{8} \end{array} \right\}$$

The Even Parts of Half a Hundred-weight.

$$\left\{ \begin{array}{l} \text{lb} \\ 14 \\ 8 \\ 7 \end{array} \right\} \text{ is the } \left\{ \begin{array}{l} \frac{1}{4} \\ \frac{1}{8} \\ \frac{1}{16} \\ \frac{1}{32} \end{array} \right\}$$

The Even Parts of a Quarter of a Hundred-weight.

$$\left\{ \begin{array}{l} \text{lb} - \\ 14-0 \\ 7-0 \\ 4-0 \\ 3-\frac{1}{2} \end{array} \right\} \text{ is the } \left\{ \begin{array}{l} \frac{1}{2} \\ \frac{1}{4} \\ \frac{1}{8} \\ \frac{1}{16} \\ \frac{1}{32} \end{array} \right\}$$

Rules of Practice.

97

C. lb d.
25 — $\frac{1}{2}$ — 19 at 17 per Pound.
4 Quarters.

102 Quarters.
28 Pounds.

825
205

$\frac{1}{3}$ 2875 Pounds-weight.
 $\frac{1}{4}$ 958 — 4
239 — 7

407 | 2 — 11
2 | 0
203 — 12 — 11

The Proof.

If 1 lb — 1 s. 5 d. — 25 C. $\frac{1}{2}$ 19 lb.

12
17

4
102
28
825
205

2875

17 Second Number.

20125
2875

48875
12 Pence.

407 | 2 — 11
2 | 0
203 — 12 — 11

F

G.

17 C. at 3 d. $\frac{1}{4}$ per Hundred-weight:

Answer 4 s. 7 d.

97 C. $\frac{1}{2}$ at 2 l. 3 s. 3 d. $\frac{1}{2}$ per Quarter.

Answer 844 l. 3 s. 9

C.

lb

32 Gross, Tare 172 at 7 d. per Pound Neat.

- 112 Pounds is 1 Hundred-weight.

64

32

32

3584 Pounds Gross.

172 Pounds Tare.

$\frac{2}{2}$ 3412 Pounds Neat.

$\frac{1}{4}$ 1706

284 - 4 d.

199 | 0 - 4

2 | 0

99-10-4 Answer.

Practice, Tare and Tret.

99

C.	lb.	d.
56	Gross, Tare	17 per Hundred-weight at 9 per
112	56	Hundred. (Pound Neat.)
112	102	
56	85	
56		
	952 Pounds Tare.	

6272 Pounds Gross.
952 Pounds Tare.

$\frac{1}{2}$ 5320 Pounds Neat.

$\frac{1}{2}$ 2660
1330

399|0
2|0

199—10 Answer.



F 2

30 C.

C.	lb	lb	lb
39	Gross, Tare 15 per C. and 4 per 104 Tret, a		
112	(4s. 6 d. per lb Neat)		
78		C.	
39		39	Gross.
39		15	Pounds Tare.
4368	Pounds Gross	195	
585	Pounds Tare.	39	
3783	Pounds Subtle.	585	Pounds Tare.
145	Pounds Tret.		
		1b	Subtle.
$\frac{1}{2}$ 3638	Pounds Neat.	26)3783	(145 Pounds Tret)
4	Shillings.	26	
14552		118	
1819		104	
1637	1	143	
2	0	130	
818	— 11 Answer.	13	

Another Way of finding the Tare.

C. lb d.
56— $\frac{1}{4}$ Gros, Tare 16 per C. at 10 $\frac{1}{2}$ per lb. Neat.

4

225

28

1800

450

$\frac{1}{7}$ 6300 Pounds Gros.

900 Pounds Tare.

$\frac{1}{2}$ 5400 Pounds Neat.

$\frac{1}{2}$ 2700

$\frac{1}{2}$ 1350

675

472 5

2 10

236—5 Answer.

See in the Table what Part of an Hundred 16 lb is,
I find the $\frac{1}{7}$.

47 C. $\frac{1}{2}$ 18 lb. at 7 s. 6 d. per Pound.

Answer, 200 l. 15 s.

67 C. $\frac{3}{4}$ 19 lb. at 5 s. 3 d. $\frac{1}{2}$ per Pound.

987 C. $\frac{1}{2}$ 14 lb. at 1 l. 10 s. 6 d. per Pound.

94 C. $\frac{1}{2}$ 17 lb. Gros, Tare 122 at 8 d. $\frac{1}{4}$ per Pound
Neat.

164 C. $\frac{1}{4}$ 14 lb. *Gross*, Tare 22 lb. per C. Tret 4 lb.
per 104 lb. at 9 d. $\frac{1}{4}$ per Pound Neat.

174 C. $\frac{1}{2}$ 16 lb. *Gross*, Tare 17 lb. per C. Tret 4 lb.
per 104 lb. at 6 s. 8 d. $\frac{1}{4}$ per Pound Neat.

C H A P. X.

The Order of subtracting Tare and Tret.

GROSS is the whole Weight with the *Hogshead*, *Chest*, or whatsoever else contains the *Commodity*.

TARE is the Allowance given for the Weight of *Hogshead*, *Chest*, &c. which is sometimes 14 lb. 16, 20, 24 lb. per *Hundred*, which being subtracted from the *Gross* Weight the *Remainder* is called *Neat*, except where there is an Allowance for *Tret*, and then the *Remainder* is called *Subtle*.

TRET is an Allowance of 4 lb. in every 104 lb. on all garbled Goods, or Goods sold by the *Pound* weight, such as *Tobacco*, *Indico*, and all Sorts of *Spices*.

CLOFF is another Allowance of 2 lb. weight claimed by the Citizens of *London* on every *Draft* above 3 C. weight on some Sort of Goods.

After the *Tret* and *Cloff* is subtracted from the *Subtle*, the *Remainder* is the *Neat* weight.

E X A M P L E.

A Merchant hath 4888 Pounds-weight of Tobacco, part whereof he bought at a certain Price per Pound, and the rest was allowed him after the Rate of 4 lb. per 104 lb. which he bought; the Question is, to know how many Pounds Neat he bought?

lb.	lb	lb
If 104—	4 —	4888
		4
		104) 19552 (188 allowed.
		104
		915
		832
		832
4888 Pounds in all.		832
188 Pounds allowed.		832
4700 Pounds bought.		00

A Grocer bought 54 Chests of Spice, each 4 C. 2 qrs. 14 lb. Gross, Tare 21 C. 3 qrs. 18 lb. Tret 4 lb. per 104 lb. what comes the Neat Weight to, at 2 s. 3 d. $\frac{1}{4}$ per Pound.

Answer 2785 l. 19 s. 5 d. $\frac{1}{4}$.

A Merchant bought 16 Hogsheads of Indico, each weighing 5 C. 3 qrs. 17 lb. Gross, Tare 18 C. 2 qrs. 19 lb. Tret 4 lb. per 104 lb. at 17 d. $\frac{3}{4}$ per Pound Neat, what comes the Neat-weight to?

Answer, 603 l. 8 s. 6 d. $\frac{1}{4}$.

C H A P. XI.

The Double Rule of Three.

W H E N there are Five Numbers proposed, then is the Question to be resolved by the *Double Rule of Three*, and workt by Two *Single Rules of Three*.

Note, That your First and Third Number be both of one Name, that is, if your First Number be *Principal*, the Third must be *Principal*; if the First be *Interest*, the Third must be *Interest*; if the First be *Time*, the Third must be *Time*; if the First be *Men*, the Third must be *Men*.

Of the Five Numbers given, Three imply a Supposition, and Two a Demand

E X A M P L E.

If 8 *Mowers* will mow down 68 *Acres* in 5 *Days*, how many *Mowers* will mow down 434 *Acres* in 10 *Days*?

Note, The Supposition is, If 8 *Mowers* mow 68 *Acres* in 5 *Days*; and the Demand is, how many *Mowers* will mow 434 *Acres* in 10 *Days*.

Double Rule of Three.

105

$\begin{array}{ccc} \text{Acres} & \text{Mowers} & \text{Acres} \\ \text{If } 68 & \text{--- } 8 \text{ ---} & 434 \\ & & 8 \text{ Second Number.} \end{array}$

First Number 68) 3472 (51 Mowers.

340

72

68

4

$\begin{array}{ccc} \text{Days} & \text{Mowers} & \text{Days} \\ \text{If } 5 & \text{--- } 51 \text{ ---} & 10 \\ & & 5 \text{ First Number} \end{array}$

Last Number 10) 255 (25 Mowers $\frac{1}{2}$

20

55

50

$\frac{5}{10}$ of a Mower.

115

11

If 750 Horses in 4 Days do eat 1222 Bushels of Oats, how many Bushels will serve 1540 Horses 24 Days?

<i>Horses</i>	<i>Bushels</i>	<i>Horses</i>
If 750	1222	1540
		1222 Second Number.

3080

3080

3080

1540

75|0)188188|0(2509 Bushels.

150

381

375

688

675

13

<i>Days</i>	<i>Bushels</i>	<i>Days.</i>
If 4	2509	24

24

10036

5018

60216

4 First Number.

15054 Bushels, will 1540 Horses eat in 24 Days

If 200

Double Rule of Three. 107

If 200 Pioneers in 3 Days cast a Trench of 350 Rods, how many Rods will 800 Men cast up in 5 Days?

Answer, 2333 Rods, $\frac{1}{3}$.

If an Army consisting of 7500 Soldiers eat up 2867 Quarters of Wheat in 56 Days, I demand how many Quarters of Wheat will an Army consisting of 130000 Soldiers eat in 142 Days?

Answer, 126009 Quarters $\frac{44}{56}$.

If a Family consisting of 9 Persons drink out 3 Kilderkins of Beer in 15 Days, how many Kilderkins will be drank out in 6 Days by another Family consisting of 23 Persons?

Answer 3 Kild. 1 Gall. $\frac{3}{15}$.

If 100 l. in 12 Months gain'd 6 l. what Principal was that which gain'd me in 10 Months 38 l.

Answer, 760 l.

If 100 l. in 12 Months gain 8 l. how much will 355 l. 10 s. gain me in 7 Months?

Answer 16 l. 11 s. 9 d. $\frac{1}{2}$.

If 684 Mariners eat 58 Porkers in 14 Days, how many Porkers will 3894 Mariners eat in 26 Days?

Answer, 612 $-\frac{1}{14}$.

A Man lent a certain Sum of Money, at 6 l. per Cent. for 5 Years and 6 Months, and at the End of that Term for the Interest thereof, received 478 l. 10 s. I demand what was the Sum lent?

Answer, 1450 l.

C H A P.

CHAP. XII.

Of FELLOWSHIP.



HERE is no Difference betwixt this *Rule* and the *Rule of Three*.

Add every Man's particular Stock together, the Total must be the First Number in the *Rule of Three*.

The *Gain* or *Loss* must be the Second Number.

Every Man's particular Stock must be the Third Number.

And the Fourth Number arising, is every Man's particular Share of the *Gain* or *Loss* required.

And by this Rule a Bankrupt's Estate is shared amongst his Creditors.

A Gentleman owed to Three several Persons 100 *l*. to A. 50 *l*. to B. 35 *l*. and to C. 15 *l*. they employed a Lawyer to get it, and his Bill came to 14 *l*. now the Question is how much every Man ought to pay of the Bill?

<i>l</i> .		<i>l</i> .
A. 50		
B. 35		
C. 15		
If 100 <i>l</i> .	<i>l</i> .	<i>l</i> .
	14	50
		14
		200
		50
		100)700(7 <i>l</i> .
		700
		00

If

Of Fellowship.

109

$\frac{l.}{\text{If } 100} \text{ --- } \frac{l.}{14} \text{ --- } \frac{l.}{35}$
 $\phantom{\text{If } 100} \phantom{\text{---}} \phantom{\frac{l.}{14}} \phantom{\text{---}} \frac{14}{35}$

140

35

100)490(4 Pounds.

400

90

20 Shillings.

100) 1800 (18 *Shil.*

100

800

800

00

$\begin{array}{ccc} l. & l. & l. \\ \text{If } 100 & \text{---} & 14 \text{ ---} & 15 \\ & & & 14 \end{array}$

60

15

100)210(2 Pounds.

200

10

20 Shil.

100)200(2 Shil.

200

00

Three

$l.$
 A. pays 7
 B. pays 4—18
 C. pays 2—2

14-0

Three Merchants made a Company, *A* put in 789 *l.* 10 *s.* *B.* put in 597 *l.* 12 *s.* *C.* put in 1876 *l.* 14 *s.* and they gained 3596 *l.* 11 *s.* I demand each Man's share of the Gains?

	<i>l.</i>	<i>s.</i>
<i>A</i> 's Share	869	19— $\frac{5}{8}\frac{3}{5}$
<i>B</i> 's Share	658	10— $\frac{3}{8}\frac{4}{5}$
<i>C</i> 's Share	2068	00— $\frac{4}{8}\frac{2}{5}$
	3596	11

Five Merchants made a Company, *A.* put in 596 *l.* 10 *s.* *B.* put in 1987 *l.* 11 *s.* *C.* put in 879 *l.* 12 *s.* *D.* put in 469 *l.* 16 *s.* *E.* put in 894 *l.* 14 *s.* and they gained 4987 *l.* 10 *s.* I demand each Man's Share of the Gains?

	<i>l.</i>	<i>s.</i>
<i>A</i> 's Share	616	3— $\frac{7}{9}\frac{1}{6}\frac{5}{5}\frac{1}{3}$
<i>B</i> 's Share	2053	2— $\frac{9}{9}\frac{2}{6}\frac{3}{5}\frac{4}{3}$
<i>C</i> 's Share	908	12— $\frac{5}{9}\frac{9}{6}\frac{1}{5}\frac{6}{3}$
<i>D</i> 's Share	485	6— $\frac{1}{9}\frac{0}{6}\frac{5}{5}\frac{2}{3}$
<i>E</i> 's Share	924	4— $\frac{5}{9}\frac{6}{6}\frac{0}{5}\frac{8}{3}$
	4987	10

A Ship being in a Tempest on the Sea, the Sailors were forced to cast over Board so much of her lading as amounted to 5946 *l.* then its reasonable that all the Merchants concerned should bear Part of that Loss according to the Stock he ventured. *A.* ventured 1287 *l.* *B.* ventured 2978 *l.* *C.* ventured 897 *l.* *D.* ventured 1987 *l.* I demand what each Person must bear of the Loss?

Of Fellowship.

111

$$\begin{array}{r}
 \text{A's Part is } 1069 - \frac{600}{7158} \\
 \text{B's Part is } 2481 - \frac{1704}{7158} \\
 \text{C's Part is } 745 - \frac{852}{7158} \\
 \text{D's Part is } 1650 - \frac{4002}{7158}
 \end{array}$$

5946

Four Merchants bought a Ship which cost them 4800 l. whereof A. must pay the $\frac{1}{3}$, B. the $\frac{1}{4}$, C. the $\frac{1}{5}$, D. the $\frac{1}{8}$; the Question is. what every Man must pay of the said Sum?

$\frac{1}{3}$ of 60 a supposed Number.

$$\begin{array}{r}
 \frac{1}{4} \quad 20 \\
 \frac{1}{5} \quad 15 \\
 \frac{1}{8} \quad 12 \\
 \quad 10 \\
 \hline
 57
 \end{array}$$

$$\begin{array}{r}
 \text{A's Part } 1684 - \frac{12}{57} \\
 \text{B's Part } 1263 - \frac{9}{57} \\
 \text{C's Part } 1010 - \frac{30}{57} \\
 \text{D's Part } 842 - \frac{6}{57} \\
 \hline
 4800
 \end{array}$$

The said Ship made a Voyage to Sea, and hath gotten all Charges and 480 l. the Question is, what is each Man's Share of the Gains?

$$\begin{array}{r}
 \text{A's Part } 168 - \frac{24}{57} \\
 \text{B's Part } 126 - \frac{18}{57} \\
 \text{C's Part } 101 - \frac{30}{57} \\
 \text{D's Part } 84 - \frac{12}{57} \\
 \hline
 480
 \end{array}$$

A

Of Fellowship.

A Merchant died, indebted to 6 Creditors, *viz.* to A. 1384 *l.* 10 *s.* to B. 897 *l.* 12 *s.* to C. 555 *l.* 8 *s.* to D. 645 *l.* 16 *s.* to E. 785 *l.* 11. and to F. 967 *l.* 14 *s.* Now after his Decease his Estate amounted to 3475 *l.* 15 *s.* how much must each Creditor have, deducting 134 *l.* 10 *s.* for Funeral Charges.

	<i>l.</i>	<i>s.</i>	
A's Share is	883	7	$\frac{101673}{104731}$
B's Share is	572	14	$\frac{53526}{104731}$
C's Share is	354	7	$\frac{63503}{104731}$
D's Share is	412	1	$\frac{23529}{104731}$
E's Share is	501	4	$\frac{64031}{104731}$
F's Share is	617	9	$\frac{7931}{104731}$
	3341	5	

Six Corn Factors, *viz.* A, B, C, D, E, F. bought 47 Quarters and 1 Bushel of Beans at 15 *s.* per Quarter, (a Quarter being 8 Bushels) which sunk upon the Kiln in drying 5 Quarters and 1 Bushel, (drying cost 18 *d.* per Quarter) working and Porteridge 3 *s.* 6 *d.* for every 5 Quarters of the Gross, and 2 *s.* Cartage for every 5 Quarters bringing Home of the Neat Quantity, of which A. had delivered for his Share 5 Quarter, B. 8, C. 10, D. 7, E 7, and F 5 Quarters; I desire to know what each Factor must pay of the Charges.

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Drying comes to	3	10	8 $\frac{1}{4}$
Working and Porteridge	1	12	11 $\frac{3}{4}$
Cartage	0	16	09 $\frac{1}{2}$
	6	00	05 $\frac{1}{2}$

	l.	s.	d.	
Answer, { A. must pay	0	14	4	0 - $\frac{14}{42}$ of a Far-
{ B. must pay	1	02	11	$\frac{1}{4}$ - $\frac{1}{42}$ thing.
{ C. must pay	1	08	08	0 - $\frac{28}{42}$
{ D. must pay	1	00	00	$\frac{3}{4}$ - $\frac{28}{42}$
{ E. must pay	1	00	00	$\frac{3}{4}$ - $\frac{28}{42}$
{ F. must pay	0	14	04	0 - $\frac{14}{42}$
Proof	6	00	05	$\frac{1}{2}$

Fellowship with Time.

N O T E, That if the Merchants have brought in unequal Stocks, and let them continue unequal Times, then must each Man's Share of the Gain be proportionable, both to his Stock and the Time of its continuance in the common Bank, which may be found out thus :

Multiply each Man's Stock by the Time of its continuance in the common Bank, then add all the *Products* together, and the *Product* must be always the First Number in the *Rule of Three*.

The Gain or Loss must be the Second Number.

And the *Product* of each Man's Stock multiplied by its Time, the Third Number.

The Fourth Number arising will be each Persons particular Share of the Gain or Loss.

Four Grasiers hired a Piece of Ground for 22 l. 12 s. A. put in 12 Oxen for 16 Days, B. put in 24 Oxen for five Days, C. put in 15 Oxen for 12 Days, and D. put in 18 Oxen for 7 Days, the Question is, how much each Grasier ought to pay.

Oxen	Days	Product
A. 12	16	192
B. 24	5	120
C. 15	12	180
D. 18	7	126
		618

Stock and Time	l.	s.	Stock and Time
If 618	22	12	192
	20	Shillings.	
	452	Shillings.	
	12	Pence.	
	5434	Pence.	

Multiply your Second Number under your Third and divide by your First, and the Quotient answers in Pence what A. is to pay for his Share, and so work for the rest.

	l.	s.	d.	Parts of a Penny.	Remainders
A. pays	7	0	5	$\frac{78}{618}$	78
B. pays	4	7	9	$\frac{120}{618}$	126
C. pays	6	11	7	$\frac{180}{618}$	498
D. pays	4	12	1	$\frac{126}{618}$	534
Proof	22	12	0		
					618)1236(2 Pence.
					1236
					000

Two

Two Merchants *A.* and *B.* enter into Company, *A.* puts in 800 *l.* and at the End of 5 Months he takes out a Sum, and leaves the rest to continue 9 Months longer, *B.* puts in 340 *l.* and at 3 Months End he put in 550 *l.* more, and then his whole Sum continues 8 Months longer. At the ballancing of their Accounts, *A.* finds he has gained 210 *l.* and *B.* gained 250 *l.* the Question is, how much *A.* took out of the Stock ?

Answer, 484— $\frac{7}{8}$.

Four Men made a Company, and in Process of Time they gained and got by Prizes at Sea 3864 *l.* *A.* put into the Stock 280 *l.* 13 Months, *B.* put in 150 *l.* 17 Months, *C.* put in 180 *l.* 12 Months, *D.* put in 260 *l.* 10 Months ; the Question is, what must each Man have of the Gains ?

Answer, $\left\{ \begin{array}{l} A. \text{ must have } 1284 - \frac{5160}{10250} \text{ of a Pound.} \\ B. \text{ must have } 899 - \frac{9150}{10250} \\ C. \text{ must have } 762 - \frac{2340}{10250} \\ D. \text{ must have } 917 - \frac{5250}{10250} \end{array} \right.$

Proof 3864

C H A P.

C H A P. XIII.

I N T E R E S T.



SIMPLE INTEREST is that which ariseth from the Principal only, and may be resolved by the *Single or Double Rule of Three.*

Compound-Interest is that which ariseth from the Principal, and also from the Interest thereof, and is commonly called *Interest upon Interest.*

If 100 *l.* in 12 Months gain 6 *l.* what will 500 *l.* 10 *s.* gain in the same Time ?

$$\begin{array}{ccccccc} & l. & & l. & & l. & s. \\ \text{If } 100 & \text{---} & 6 & \text{---} & 500 & \text{---} & 10 \\ & & & & & & 6 \end{array}$$

$$\begin{array}{r|l} l. & 30 \\ \hline & 03-00 \\ & 20 \end{array}$$

$$\begin{array}{r|l} & 060 \\ & 12 \end{array}$$

$$\begin{array}{r|l} d. & 720 \\ & 4 \end{array}$$

$$\begin{array}{r} 80 \end{array}$$

So that 500 *l.* 10 *s.* will gain in 12 Months, at the Rate of 6 *l.* per Cent. 30 *l.* 0 *s.* 7 *d.* See the Work.

If

Of Simple Interest.

117

If 100 l. in 12 Months gain 6 l. what will 5 l. 12 s. 4 d. $\frac{1}{4}$ gain in the same Time?

l.	l.	l. s. d.
If 100	6	5-12-4- $\frac{1}{4}$
20	20	20

2000 Shil.	120 Shil.	112 Shillings.
12	12	12

24000 Pence	1440 Pence.	1348 Pence.
4	4	4

96000 Farth.	5760 Farth.	5393 Farthings.
		5760 Second Number.

323580
37751
26965

96000)31063680(323 Farthings.

288000 4

226368 80- $\frac{3}{4}$

192000 12

343680 6-8- $\frac{3}{4}$ $\frac{55}{36}$

288000

55680

So that 5 l. 12 s. 4 d. $\frac{1}{4}$ lent out at 6 l. per Cent. for 12 Months, will gain 6 s. 8 d. $\frac{3}{4}$ $\frac{55}{36}$ of a Farthing.

If 100 l. in 12 Months gain 7 l. what will 487 l. 10 s. 8 d. gain in the same Time.

Answer, 34 l. 2 s. 6 d. $\frac{1}{2}$.

If 100 l. gain in 12 Months 6 l. what will 287 l. gain in 2 Years and 8 Months?

Answ. 45 l. 18 s. 5 d.

In

In the following Table. Seek the Sum desired, and even with the same, you may find the Interest due for One Month to Twelve, as is there expressed, viz.

Principal Money.	Interest at 6 per Cent. for 500 l. 400 l. &c. is for each Month as followeth.					
	1 Month	2 Mon.	3 Mon.	4 Mon.	5 Mon.	6 Mon.
Pounds	l. s. d.	l. s. d.	l. s. d.	l. s. d.	l. s. d.	l. s. d.
500	2-10-0	5-0-0	7-10-0	10-0-0	12-10-0	15-0-0
400	2-0-0	4-0-0	6-0-0	8-0-0	10-0-0	12-0-0
300	1-10-0	3-0-0	4-10-0	6-0-0	7-10-0	9-0-0
200	1-0-0	2-0-0	3-0-0	4-0-0	5-0-0	6-0-0
100	0-10-0	1-0-0	1-10-0	2-0-0	2-10-0	3-0-0
90	0-9-0	0-18-0	1-7-0	1-16-0	2-5-0	2-14-0
80	0-8-0	0-16-0	1-4-0	1-12-0	2-0-0	2-8-0
70	0-7-0	0-14-0	1-1-0	1-8-0	1-15-0	2-2-0
60	0-6-0	0-12-0	0-18-0	1-4-0	1-10-0	1-16-0
50	0-5-0	0-10-0	0-15-0	1-0-0	1-5-0	1-10-0
40	0-4-0	0-8-0	0-12-0	0-16-0	1-0-0	1-4-0
30	0-3-0	0-6-0	0-9-0	0-12-0	0-15-0	0-18-0
20	0-2-0	0-4-0	0-6-0	0-8-0	0-10-0	0-12-0
10	0-1-0	0-2-0	0-3-0	0-4-0	0-5-0	0-6-0

Interest

Of Simple Interest.

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Interest at 6 per Cent. for 500 l. 400 l. &c. is
for each Month as followeth.

Principal Money.	7 Month	8 Mon	9 Mon.	10 Mon.	11 Mon.	12 Mon.
Pounds l. s. d.	l. s. d.	l. s. d.	l. s. d.	l. s. d.	l. s. d.	l. s. d.
500	17 10-0	20-0-0	22-10-0	25-0-0	27-10-0	30-0-0
400	14- 0-0	16-0-0	18- 0-0	20-0-0	22- 0-0	24-0-0
300	10-10-0	12-0-0	13-10-0	15-0-0	16-10-0	18-0-0
200	7- 0-0	8- 0-0	9- 0-0	10-0-0	11- 0-0	12-0-0
100	3-10-0	4- 0-0	4-10-0	5- 0-0	5-10-0	6- 0-0
90	3- 3-0	3-12-0	4- 1-0	4-10-0	4-19-0	5- 8-0
80	2-16-0	3- 4-0	3-12-0	4- 0-0	4- 8-0	4-16-0
70	2- 9-0	2-16-0	3- 3-0	3-10-0	3-17-0	4- 4-0
60	2- 2-0	2- 8-0	2-14-0	3- 0-0	3- 6-0	3-12-0
50	1-15-0	2- 0-0	2- 5-0	2-10-0	2-15-0	3- 0-0
40	1- 8-0	1-12-0	1-16-0	2- 0-0	2- 4-0	2- 8-0
30	1- 1-0	1- 4-0	1- 7-0	1-10-0	1-13-0	1-16-0
20	0-14-0	0-16-0	0-18-0	1- 0-0	1- 2-0	1- 4-0
10	0- 7-0	0- 8-0	0- 9-0	0-10-0	0-11-0	0-12-0

Interest

Interest

Of Simple Interest.

		Interest at 6 per Cent. for 500 l. 400 l. &c. is for each Day as followeth.										Prin- cipal Money.
		1 Day.		2 Days.		3 Days.		4 Days.		5 Days.		
Pounds	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q.	s. d. q.		Poun
500	1-8-0	3-4-0	5-0-0	6-8-0	8-4-0							500
400	1-4-0	2-8-0	4-0-0	5-4-0	6-8-0							400
300	1-0-0	2-0-0	3-0-0	4-0-0	5-0-0							300
200	0-8-0	1-4-0	2-0-0	2-8-0	3-4-0							200
100	0-4-0	0-8-0	1-0-0	1-4-0	1-8-0							100
90	0-3- $\frac{1}{2}$	0-7-0	0-10- $\frac{3}{4}$	1-2- $\frac{1}{4}$	1-6-0							90
80	0-3-0	0-6-0	0-9-0	1-0-0	1-4-0							80
70	0-2- $\frac{3}{4}$	0-5- $\frac{1}{2}$	0-8- $\frac{1}{4}$	0-11-0	1-2-0							70
60	0-2- $\frac{1}{4}$	0-4- $\frac{3}{4}$	0-7-0	0-9- $\frac{1}{2}$	1-0-0							60
50	0-2-0	0-4-0	0-6-0	0-8-0	0-10-0							50
40	0-1- $\frac{1}{2}$	0-3-0	0-4- $\frac{3}{4}$	0-6- $\frac{1}{4}$	0-8-0							40
30	0-1-0	0-2-0	0-3- $\frac{1}{2}$	0-4- $\frac{3}{4}$	0-6-0							30
20	0-0- $\frac{3}{4}$	0-1- $\frac{1}{2}$	0-2- $\frac{1}{4}$	0-3-0	0-4-0							20
10	0-0- $\frac{1}{4}$	0-0- $\frac{3}{4}$	0-1-0	0-1- $\frac{1}{2}$	0-2-0							10

The
but
Inter

Of Simple Interest.

121

Interest at 6 per Cent. for 500 l. 400 l. &c.
is for each Day as followeth.

Principal Money.	10 Days.	20 Days.	25 Days.	30 Days.
l. s. d.	l. s. d.	l. s. d.	l. s. d.	l. s. d.
500	0-16-8	1-13-4	2-1-8	2-10-0
400	0-13-4	1-6-8	1-13-4	2-0-0
300	0-10-0	1-0-0	1-5-0	1-10-0
200	0-6-8	0-13-4	0-16-8	1-0-0
100	0-3-4	0-6-8	0-8-4	0-10-0
90	0-3-0	0-6-0	0-7-6	0-9-0
80	0-2-8	0-5-4	0-6-8	0-8-0
70	0-2-4	0-4-8	0-5-10	0-7-0
60	0-2-0	0-4-0	0-5-0	0-6-0
50	0-1-8	0-3-4	0-4-2	0-5-0
40	0-1-4	0-2-8	0-3-4	0-4-0
30	0-1-0	0-2-0	0-2-6	0-3-0
20	0-0-8	0-1-4	0-1-8	0-2-0
10	0-0-4	0-0-8	0-0-10	0-1-0

The Fractions in this Table (being very small, but of a Farthing,) are omitted.

Inter

G

The

The Number of Days from every Day in any Month, to the same Day in any other. 122

January	February	March	April	May	June	July	August	Septem.	October	Novem.	Decemb.
Feb. 31	Mar 28	Apr. 31	May. 30	Jun. 3	July. 30	Aug. 31	Sep. 31	Oct. 30	Nov. 31	Dec. 30	Jan. 31
Mar 59	Apr. 59	May. 61	Jun. 61	July 61	Aug. 61	Sep. 62	Oct. 61	Nov. 61	Dec. 61	Jan. 61	Feb. 62
Apr 90	May. 89	Jun. 92	July. 91	Aug. 92	Sep. 92	Oct. 92	Nov. 92	Dec. 91	Jan. 92	Feb. 92	Mar. 90
May 120	Jun 120	Jul. 122	Aug. 122	Sep. 123	Oct. 122	Nov. 23	Dec 122	Jan 122	Feb. 123	Mar 120	Apr 121
Jun 151	Jul. 150	Aug. 153	Sep. 153	Oct. 153	Nov. 153	Dec. 153	Jan 153	Feb. 153	Mar 151	Apr 151	May 151
Jul. 181	Aug. 181	Sep. 184	Oct. 183	Nov. 184	Dec. 183	Jan 184	Feb 184	Mar 181	Apr 182	May 181	Jun 182
Aug. 212	Sep. 212	Oct. 214	Nov. 214	Dec. 214	Jan 214	Feb. 215	Mar 212	Apr 212	May 212	Jun 212	Jul. 212
Sep. 243	Oct. 242	Nov. 245	Dec. 244	Jan 245	Feb. 245	Mar 243	Apr 243	May 242	Jun 243	Jul. 242	Aug. 243
Oct. 273	Nov. 273	Dec. 275	Jan 275	Feb. 276	Mar 273	Apr 274	May 273	Jun 273	Jul. 273	Aug. 273	Sep. 274
Nov. 304	Dec. 303	Jan 306	Feb. 376	Mar 304	Apr 304	May 304	Jun 304	Jul 303	Aug. 304	Sep. 304	Oct. 304
Dec. 334	Jan 334	Feb. 337	Mar 334	Apr 335	May 334	Jun 334	Jul. 334	Aug. 334	Sep. 335	Oct. 334	Nov. 335

This Table shews you to find out any Number of Days under a Year from one Month to another thus: Find the First Month in the Top, and the Second in the same Column. Example.

From { June March Days.

Id
d 6
pon
1
100
Near
l.
100
39
cars 2
420

Interest upon Interest.

I demand the *Interest* of 374 l. lent out for 2 Years and 6 Months after 6 l. per Cent. per Annum, *Interest* upon *Interest*.

l. l. l.
100 ————— 6 ————— 374
6

22 44

1 20 Shillings.

8 80

12 Pence.

l.
374 Money lent
Years 22—8—9— $\frac{1}{2}$ Interest.

9 60

4 Farthings

396—8—9— $\frac{1}{2}$

2 40

l. l. l. s. d.
100 ————— 6 ————— 396—8—9— $\frac{1}{2}$
6

23 78—12—9—0

1 20

15 72

12

8 73

4

l. s. d.
396—8—9— $\frac{1}{2}$ Int. and Prin.
Years 23—15—8— $\frac{1}{2}$ Interest.

2 92

420—04—6—0

l.	l.	l.	s.
If 100	3	420	4
		12	60—13
			20
		12	13
			12
		1	62
			4
		2	48

	l.	s.	d.	
	420	4	6	Principal and Inter
6 Months	12	12	1	$\frac{1}{2}$ Interest.
	432	16	7— $\frac{1}{2}$	

So that you find by the Work, That at the End
Two Years and Six Months 432 l. 16 s. 7 d. $\frac{1}{2}$
paid in.

28 l. 18 s. 6 d. let out at 6 l. per Cent.
9 Months and 5 Days, and paid in at the End
2 Years, 5 Months, and 4 Days 6 l. 17 s. 9 d.
after 7 Months and 3 Days the Remainder was
in, I demand what was the Sum paid in with Int
upon Interest?

Of Interest upon Interest.

125

First Stating.

Days	l.	s.	d.	Mon.	Days
365	1	14	8	$\frac{1}{2}$	9-5
	20				30
	34				275
	12				
	416				
	4				
	1666				
	275				
	8330				
	11662				
	3332				
365)458150(1255	365	4			
	931	313-3			
	730	12			
	2015	2 6-1			
	1825	2 0			
	1900	1-6-1- $\frac{3}{4}$			
	1825				
	75				

G 3

Second

Second Stating:

	<i>l.</i>	<i>l.</i>	<i>l.</i>	<i>s.</i>	<i>d.</i>
If 100	—	6	—	30	4

1	81	7	10
	20		

16	27
	12

3	34
	4

1	38
---	----

Third Stating:

	<i>l.</i>	<i>l.</i>	<i>l.</i>	<i>s.</i>
If 100	—	6	—	32

1	92	0
	20	

18	45
	12

5	46
	4

1	84
---	----

Fourth Stating.

<i>d.</i>	<i>Days</i>	<i>l.</i>	<i>s.</i>	<i>d.</i>	<i>Mon. Day</i>
7	365	2	0	7	5-4
		20			30
10		40			154
		12			
		489			
		4			
		1956			
		154			
		7824			
		9780			
		1956			
	365)301224(825	2920	4		
		922	206- $\frac{1}{4}$		
		730	12		
		1924	17-2- $\frac{1}{4}$		
		1825			
		99			

Fifth Stating.

Days	l.	s.	d.	Mon. Day
If 365	1	13	6 — $\frac{1}{4}$	7 — 3
	20			30
	33			213
	12			
	402			
	4			
	1609			
	213			
	4827			
	1609			
	3218			
365)342717 (938 Farthings.				
	3285	4		
	1421	234 — 2		
	1095	12		
	3267	19 — 6 — $\frac{1}{2}$		
	2920			
	347			

Add

Of Interest upon Interest. 129

Adding of Principal and Interest.

Day	l.	s.	d.	
—3	28	18	6	Principal.
0	1	6	1— $\frac{3}{4}$	Interest for the 9 Months and 5 Days.
3	30	4	7— $\frac{3}{4}$	Principal and Interest.
—	1	16	3— $\frac{1}{4}$	Interest for the First Year.
	32	0	11—0	Principal and Interest.
	1	18	5— $\frac{1}{4}$	Interest for the Second Year.
	33	19	4— $\frac{1}{4}$	Principal and Interest.
	17	2	— $\frac{1}{4}$	Interest for Five Months Four Days.
	34	16	6— $\frac{1}{2}$	Principal and Interest.
	6	17	—0	First Payment. Subtract.
	27	18	9— $\frac{1}{2}$	Remains.
	19	6	— $\frac{1}{2}$	Interest for Seven Months Three Days.
	28	18	4—0	The Principal and Interest paid in.

March the 15th, 1697. lent 59 l. 15 s. 6 d. at 7 l. per Cent. per Annum, for 3 Years, 3 Months, and Days, Interest upon Interest, and paid in 17 l. 11 s. 9 d. the 17th of January, and July the 19th 1701. paid more 12 l. 17 s. 9 d. and March the 28th, 1702. paid more 7 l. 9 s. and March the 26th, 1703. the whole was paid in. I demand the Interest and Principal paid in.

Answer, 47 l. 19 s. 3 d. $\frac{1}{4}$ Principal and Interest paid in.

130 Of Interest upon Interest.

A Table to find out what any Sum of Money will amount unto for 31 Years or under, at 6 l. per Cent. Interest upon Interest.

Years	l.	s.	d.
1	1	1	2 $\frac{1}{4}$
2	1	2	5 $\frac{1}{2}$
3	1	3	9 $\frac{3}{4}$
4	1	5	3
5	1	6	9
6	1	8	4 $\frac{1}{4}$
7	1	10	0 $\frac{3}{4}$
8	1	11	10 $\frac{1}{2}$
9	1	13	9 $\frac{1}{4}$
10	1	15	9 $\frac{3}{4}$
11	1	17	11 $\frac{1}{2}$
12	2	0	2 $\frac{3}{4}$
13	2	2	7 $\frac{3}{4}$
14	2	5	2 $\frac{1}{2}$
15	2	7	11
16	2	10	9 $\frac{1}{2}$
17	2	13	10
18	2	17	0 $\frac{3}{4}$
19	3	0	5 $\frac{3}{4}$
20	3	4	1 $\frac{1}{2}$
21	3	7	11 $\frac{1}{2}$
22	3	12	0 $\frac{1}{2}$
23	3	16	4 $\frac{1}{2}$
24	4	0	11 $\frac{1}{2}$
25	4	3	9 $\frac{3}{4}$
26	4	10	11 $\frac{1}{2}$
27	4	16	5
28	5	2	2 $\frac{1}{2}$
29	5	8	4
30	5	14	10
31	6	1	8 $\frac{1}{2}$

The Use of this Table.

I demand what 60 l. comes to, Interest upon Interest for 12 Years. Look against Number 12 in the first Column and you will find what the Interest upon Interest of 1 l. comes to in that Time; then say

the Rule of Three.

l.	l.	s.	d.
If 1	—	2	0 — 2 — $\frac{3}{4}$ —
		20	
		40	
		12	
		482	
		4	
		1931	
		60	
		115860	
		4	
		28965	
		12	
		241	3 — 9
		2	0
Ans.	120	13	9

Sup

A Table of Annuities.

131

Suppose a Man puts out 150 l. at Interest upon Interest for 21 Years to portion his Daughter, the Time being expired, what has the Maid for her Portion ?

Answer, 509 l. 13 s. 9 d.

A very useful Table to find out the present worth of the Annuity or Yearly Rent for 21 Years or under, after the Rate of 6 l. per Cent. per Annum.

Years	l.	s.	d.
1	0	18	10 $\frac{1}{2}$
2	1	16	8
3	2	13	5 $\frac{1}{2}$
4	3	9	3 $\frac{1}{2}$
5	4	4	2 $\frac{3}{4}$
6	4	18	4
7	5	11	7 $\frac{3}{4}$
8	6	4	2 $\frac{1}{2}$
9	6	16	0 $\frac{1}{2}$
10	7	7	2 $\frac{1}{2}$
11	7	17	9
12	8	7	8
13	8	17	0 $\frac{1}{2}$
14	9	5	11 $\frac{3}{4}$
15	9	14	2 $\frac{1}{4}$
16	10	2	1 $\frac{1}{4}$
17	10	9	6 $\frac{1}{2}$
18	10	16	6 $\frac{1}{4}$
19	11	3	1 $\frac{3}{4}$
20	11	9	4 $\frac{3}{4}$
21	11	15	3 $\frac{1}{4}$

I desire to know what 1 l. Yearly Rent is worth for 16 Years in ready Money. Look against Number 16 in the first Column, and you'll find 1 l. for 16 Years, is worth 10 l. 2 s. 1 d. $\frac{1}{4}$.

Then to know what any other Number is worth for the same Time ; say by the Rule of Three,

l.	l.	s.	d.	l.
If 1	10	2	1 $\frac{1}{4}$	125
Answer	1263	l.	3 s.	cd. $\frac{1}{4}$.

What is 8 l. per Annum worth in ready Money for 8 Years and $\frac{1}{2}$.

Look in the Table for 8 and you'll find 6 l. 4 s. 2 d. $\frac{1}{2}$ then say by the Rule of Three.

l.	l.	s.	d.	l.
If 1 be worth	6	4	2 $\frac{1}{2}$	what will 8
Answer,	49	l.	13 s.	8 d.

Now

Supp

Rebate or Discount.

133

18 Days, but the other is willing to pay present Money upon rebate after 8 l. per Cent. per Annum.

E X A M P L E.

<i>Months</i>	<i>l.</i>	<i>Mon. Days.</i>
If 12	8	13—18
30		30 Days.
365		408 Days.
		8
		365)3264(8 Pounds.
		2920
		344
		20
		365)6880(18 Skillin.
		365
		3230
		2920
		310
		12
		365)3720(10 Pence.
		365
		70
		4
		$\frac{2}{3} \frac{80}{63}$ of a Farthin.

Then say, If 108 l. 18 s. 10 d. abate 8 l. 18 s. 10 d. what shall the given Sum abate? The Quotient will shew the Rebate, which being substracted out of the

the given Sum, sheweth the Money to be paid presently.

EXAMPLE.

<i>l. s. d.</i>	<i>l. s. d.</i>	<i>l. s. d.</i>
If 108-18-10	8-18-10	679-10-8
20	20	2
2178	178	13590
12	12	12
26146	2146	163088
		2146

978528
652352
163088
326176

26146)349986848(13385 d.
26146 ····· 12

88526 111 | 5-
78438 2 | 0

100888 55-15
78438

224504
209168

	<i>l. s. d.</i>	
Was to be paid	679-10-8	153368
Is to be paid	623-15-3	130730
Is rebated	55-15-5	22638

Rebate or Discount.

135

A Merchant sells Goods for 324*l.* for 2, 5 Months, the Person buying will pay present Money; I demand the Discount after the Rate of 6 *l.* per Cent.

By 2, 5 Months is to be understood, the $\frac{1}{2}$ of the Money is to be paid at 5 Months, and the other $\frac{1}{2}$ 5 Months after that.

Mon. *l.* Mon.
If 12 — 6 — 10

6
60
12

5 Pounds.

<i>l.</i>	<i>s.</i>	<i>l.</i>	<i>s.</i>	<i>l.</i>	
If 102	10	2	10	162	
20		20		20	
2050		50		3240	
				50	

2050)162000(79
14350 210

18500 3-19
18450

50

	<i>l.</i>	<i>s.</i>	
Was to be paid	162	0	First 5 Months.
Is to be paid	158	1	
Is rebated	3	19	

If

136 Of Rebate or Discount.

If $105 \overset{l.}{\text{---}} \overset{l.}{5} \text{---} \overset{l.}{162}$

$105 \overline{) 810} (7 \text{ Pounds.}$
 735
 75
 20

$105 \overline{) 1500} (14 \text{ Skill.}$
 105
 450
 420
 30
 12

$105 \overline{) 360} (3 \text{ Pence.}$
 315
 45
 4

	<i>l.</i>	<i>s.</i>	<i>d.</i>
Was to be paid	162	0	0
Is to be paid	154	5	8 $\frac{3}{4}$
Is rebated	7	14	3 $\frac{1}{4}$

$105 \overline{) 180} (1 \text{ Farth.}$
 105
 75

A Merchant sold Goods to the Value of 250 *l.* to be paid at 8 Months, how much ought the Buyer to pay present, rebating 6 *l.* per Cent.

Answer, 240 *l.* 7 *s.* 8 *d.*

Rebate or Discount.

137

A Merchant sold 5 Butts of Currants of Weight and Price, viz.

No.		C.	lb.	lb.
1	Gross	9— $\frac{1}{2}$	16	Tare 95
2	—	8— $\frac{1}{4}$	24	— 76
3	—	7— $\frac{3}{4}$	18	— 84
4	—	9— $\frac{1}{2}$	25	— 96
5	—	8— $\frac{3}{4}$	14	— 90

At 42 s. per C. weight Neat, to be paid at 16 Months, but the Buyer is willing to pay present Money, rebating 7 l. per Cent. Answ 78 l. 2 s. 3 d.

CHAP. XV.

A Collection of Questions for the Learners Practice.



Merchant bought 146 Pieces of Broad-Cloth at 8 l. 11 s. 9 d. per Piece, each Piece containing 29 Yards, which he ship'd for Spain, to have returned from thence :

V I Z.

- $\frac{1}{5}$ in Spanish Tobacco at 6 s. 8 d. per Pound.
 - $\frac{1}{5}$ in Malaga Raisins, 1 l. 17 s. 8 d. per C. weight.
 - $\frac{1}{5}$ in Raisins of the Sun, at 2 l. 5 s. 9 d. per C. wt.
 - $\frac{1}{5}$ Canary Wine, at 8 d. $\frac{1}{4}$ per Pint.
 - $\frac{1}{5}$ in Malaga Sack, at 9 d. $\frac{1}{2}$ per Pint.
- demand how much of each Sort he had according to the Tenure of the Question ?

- 6 C. 2 qrs. 24 lb. 4 oz. $\frac{1}{8}$ Tobacco.
- 6 Tun. 13 C. 0 qrs. 16 lb. $\frac{4}{5}$ Malaga Raisins.
- 5 Tun. 9 C. 2 qrs 13 lb. $\frac{1}{5}$ Raisins of the Sun.
- 3 T. 2 Hogsh. 29 Gal. 1 Pot. 1 Qt. 0 Pt. $\frac{2}{3}$ Canary.
- 3 T. 0 Hogsh. 35 Gal. 1 Po. 1 Qt. 0 Pt. $\frac{3}{8}$ Malaga Sack.

A

A Man died, left his Wife big with Child, and his Legacy was 500 Pounds, he left it after this Manner; viz. That if she had a Son, then the Son should have the $\frac{2}{3}$ and the Mother the $\frac{1}{3}$, but if she had a Daughter, then the Mother should have the $\frac{1}{2}$ and the Daughter the $\frac{1}{2}$ of the Legacy, but she brought forth Son and Daughter; the Question is what each of them must have according to the Testator's Will?

EXAMPLE.

1	
2	
3	
If 6	l.
	500
	6
	83 $\frac{2}{3}$
If 6	l.
	500
	2
	1000
	6
	166 $\frac{4}{6}$
If 6	l.
	500
	3
	1500
	6
	250
	166 $\frac{4}{6}$
	83 $\frac{2}{6}$

250 Son's Share.
 166 $\frac{4}{6}$ Mother's Share.
 83 $\frac{2}{6}$ Daughter's Share.

L. 500

A General hath 10000 Men, and he would place 185 Men in a File, he is desirous to know how many Ranks he may make?

Answer 54— $\frac{1}{2}$.

If 7 Woodcocks and 5 Partridges cost 8 s. 8 d. reckon 3 Partridges to cost as much as 1 Woodcock, what is the Price of each Bird?

Answer, 4 d. the Price of a Partridge.

A Footman goeth 28 Miles a Day (the artificial Day being 12 Hours) from York to Norwich. A Horseman is sent after him, and taketh his Journey 4 Days after the Footman and travelleth 45 Miles a Day, in what Time will he overtake the Footman.

Answer, 6 Days, 7 Hours, $\frac{1}{7}$.

There is a Cistern hath 3 Cocks, the first Cock will empty the Cistern in the $\frac{1}{4}$ of an Hour, the other in the $\frac{1}{2}$ of an Hour, and the third in $\frac{3}{4}$ of an Hour; in how long Time will all the three Cocks, if set open, empty this Cistern?

E X A M P L E.

Minutes		
$\frac{1}{4}$ of an Hour is	15	
$\frac{1}{2}$ of an Hour is	30	
$\frac{3}{4}$ of an Hour is	45	
Minutes	Cistern	Minutes
If 15	— I —	60
		15)60(4 Cisterns.
		0
		—
Minutes	Cistern	Minutes
If 30	— I —	60
		30)60(2 Cisterns.
		0
		—

If

Minutes	Cistern	Minutes
If 45	1	60
		45) 45 (1 Cistern $\frac{1}{3}$
		<u>$\frac{1}{4} \frac{5}{7}$</u> or $\frac{1}{3}$

So that 7 Cisterns and the $\frac{1}{3}$ may be emptied in an Hour; therefore, one Cistern in the $\frac{1}{7}$ and $\frac{1}{3}$ of $\frac{1}{7}$ of an Hour, reduce the $\frac{1}{7}$ and the $\frac{1}{3}$ of $\frac{1}{7}$, *facit* 28, and the $\frac{1}{3}$ of $\frac{1}{7}$ is 21, and $\frac{1}{7}$ is 147; so that it is $\frac{2}{147}$ of 60 Minutes, thus:

If 147	— 28 —	60
		28
	<u> </u>	
		480
		120
	<u> </u>	
	147) 1680	(11 Minutes $\frac{6}{147}$ of a Minute
	147	
	<u> </u>	
	210	
	147	
	<u> </u>	
	$\frac{6}{147}$	of a Minute.

So that if all the Cocks be set open at once, the Cistern will be emptied in 11 Minutes, $\frac{6}{147}$ of a Minute.

A Woman bought 100 of Oranges at 2 a Penny, and 100 at 3 a Penny, and sold them again 5 for Two pence, how much did she gain or lose. *Ans.* 3 d. $\frac{1}{2}$

The Cock of a Conduit running into a Cistern filleth it in 5 Hours, this Cistern hath a Cock which empty the Cistern in 17 Hours; in what Time will the Cistern be full when both Cocks are set open at once.

Answer 7 Hours, 5 Minutes
Then

for the Learner's Practice. 141

There was a Legacy left of 160 Pound given in Shillings, Sixpences, Groats, and Threepences, how many poor People will it equally relieve, that there be no more of one Sort than another ?

Answer, 1536 poor People of each Sort.

The Iron-Work that goes round the Cupola in St. Paul's Church, being in Number 130 Pieces, each weighing 8 C. 0 qrs. 15 lb. it being the Work of 7 Men for 26 Weeks, and each Man's Wages 20 s. per Week, and supposing the Iron to be worth 1 s. per Pound when it is fixed; I demand how much the whole comes to, and what the Workmens Wages is, and likewise what the Undertaker gains by the Work, allowing that the Iron and painting of it stands him in 5 d. per Pound ?

	<i>l.</i>	<i>s.</i>	<i>d.</i>
[The Whole comes to	5921	10	0
Iron and Painting	2467	5	10
Workmens Wages	182	0	0
	2649	5	10
	5921	10	0
	2649	5	10
Gains	3272	4	2

Answer, {

A Cistern containing 1980 Gallons, hath 3 Cocks continually running, the first Cock runs out 30 Gallons in an Hour, the second 18 Gallons, and the third 12 Gallons; in how long Time will the Cistern be emptied, setting all the Cocks open ?

Answer, 1 Day, 9 Hours.

142 A Collection of Questions

A Nobleman dying, left 10000 *l.* to be distributed amongst unbeneficed Ministers, poor deserving Gentlemen, and decay'd Tradesmen, 40 Ministers were to have 10 *l.* to the Gentlemens 5 *l.* 50 Gentlemen were to have 5 *l.* to the Tradesmens 1 *l.* 60 Tradesmen were likewise to have their Share of the Legacy ; I demand what will the Ministers, Gentlemens, and Tradesmens Shares be, and how many of each Sort it will relieve, according to the Testator's Will ?

		<i>l.</i>	<i>s.</i>	<i>d.</i>	
Answer,	{ 400 Ministers	5633	16	0	$\frac{1}{2}$ $\frac{5}{11}$
	{ 250 Gentlemen	3521	2	6	$\frac{1}{4}$ $\frac{49}{71}$
	{ 60 Tradesmen	845	1	4	$\frac{3}{4}$ $\frac{41}{71}$

Proof 10000 — 0 — 0 — 0

A Man hath 3 Sons, amongst which he left 1000 *l.* to be divided as followeth, the Eldest Son to have 4 *l.* the Second 2 *l.* and for the Youngest 1 *l.* how much must each Son have of the Father's Estate ?

		<i>l.</i>	<i>s.</i>	<i>d.</i>	
Answer,	{ Eldest Son	571	8	6	$\frac{3}{4}$ $\frac{1}{11}$
	{ Second Son	285	14	3	$\frac{1}{4}$ $\frac{5}{11}$
	{ Third Son	142	17	1	$\frac{1}{2}$ $\frac{1}{11}$

Proof 1000 — 0 — 0 — 0

A Conduit hath a Cock which running into a Cistern will fill it in 10 Minutes, this Cistern hath 3 Cocks, one before and one on each Side. That Cock before, will empty the Cistern in an Hour, and that on the Right Side will empty in $\frac{3}{4}$ of an Hour, and that on the Left Side, will empty the Cistern in $\frac{1}{2}$ an Hour. In how long Time will the Cistern be filled setting all the Cocks open ?

Answer, 36 Minutes

for the Learner's Practice 143

A rich Man dying, left 10000 Pounds to be distributed as followeth, viz.

$\frac{3}{4}$ to the beautifying of Exeter-College in Oxford.
 $\frac{1}{4}$ to Trinity-College in Cambridge, and the
 $\frac{1}{4}$ to Chelsea-College. How much must each of them have?

l.
 Answer, $\left\{ \begin{array}{l} \text{Exeter-College must have } 3719 \frac{1}{121} \\ \text{Trinity-College must have } 3305 \frac{9}{121} \\ \text{Chelsea-College must have } 2975 \frac{2}{121} \end{array} \right.$

Proof 10000

A General going to view the Camp, gave to an Officer 20 Guineas to be distributed among 500 Soldiers, the Fraction or Remainder of every Soldier's Proportion the Officer was to have, I demand each Soldier's Share, and what the Officer had?

Answer, $\left\{ \begin{array}{l} \text{Each Soldier had } 0-10-\frac{3}{4} \\ \text{Officer had } 2-11-0 \end{array} \right.$

A Drover driving Sheep, was asked were he was going with those Score of Sheep, answer'd, there is not a Score, for I want as many more, and half as many more, and 2 Sheep and $\frac{1}{2}$ to make the Number of them a Score; I demand how many Sheep the Drover had when he made that Answer?

Answer, 7.

A Cistern containing 5170 Gallons having 4 Cocks, runs out, viz.

1st Cock	15 Gallons	$\left\{ \begin{array}{l} \text{in an Hour.} \end{array} \right.$
2d Cock	19 Gallons	
3d Cock	10 Gallons	
4th Cock	6 Gallons	

How long Time will this Cistern be emptied, when a Fifth Cock runs into the Cistern 24 Gallons an Hour? Answ. 8 Days, 6 Hours, 50 Min. $\frac{20}{121}$.

There

There was at Supper a Knight, a Gentleman, and a Tradesman, they spent 20 *Shillings*, the Knight would pay the $\frac{1}{2}$, the Gentleman the $\frac{1}{3}$, and the Tradesman the $\frac{1}{4}$, what must every Man pay of this Reckoning ?

		s.	d.	
Answer, {	Knight's Share	9	2	$\frac{3}{4}$ $\frac{1}{12}$
	Gentleman's Share	6	1	$\frac{3}{4}$ $\frac{1}{12}$
	Tradesman's Share	4	7	$\frac{1}{4}$ $\frac{1}{12}$

Proof 20—0—0—

A Merchant left his Wife big with Child, and by Will bequeathed his Goods, which amounted to 2600 *Pounds*, thus, That if his Wife was delivered of a Female Child, then she should have $\frac{2}{3}$ and the Daughter the $\frac{1}{3}$, but if she should bring forth a Male Child, then he should have the $\frac{2}{3}$ and the Mother the $\frac{1}{3}$; but it happened that the Mother was delivered of two Boys and a Girl, how shall the Legacy be distributed according to the Testator's Will ?

		l.	s.	d.
Answer, {	Sons Share	945	9	1—0—
	Mother's Share	472	14	6— $\frac{1}{2}$ —
	Daughter's Share	236	7	3— $\frac{1}{4}$ —

Proof 2600— 0—0—0—

Suppose a Dog, a Wolf, and a Lion, were to devour a Sheep, and the Dog could eat up the Sheep in an Hour, the Wolf in $\frac{3}{4}$, and the Lion in $\frac{1}{2}$ of an Hour. Now if the Lion begin to eat the Sheep $\frac{1}{8}$ of an Hour before the other Two, and afterward the Three eat together; the Question is, in what Time the Sheep will be devoured ?

Answer, $\frac{3}{10\frac{1}{4}}$ of an Hour
C H A

C H A P. XVI.

Notation of DECIMALS.

Shall shew you the Use of *Decimal Fractions* in all the Rules of *Arithmetick*, but principally in the solving Questions of *Interest* and *Rebate*, according to the several Rates of *Interest*, both *Simple* and *Compound*, with the true valuation of *Leases* and *Annuities*, either present in *Reversion*, and likewise their Use in calculating *Tables* for that Purpose, &c.

Now that the Nature of a *Decimal Fraction* may be conceived, imagine a Foot Rule to be divided into 10 equal Parts, each Division will be $\frac{1}{10}$, then imagine every of those Tenthhs to be divided into 10 equal Parts, then a Foot will be divided into an hundred equal Parts, every first Division will be $\frac{1}{100}$ or a Cent, and every second Division (in respect to the whole) will be $\frac{1}{1000}$, so that if 3 Tenthhs and a Half be to be expressed, it's $\frac{35}{1000}$; by this Means, an *Hour*, a *Pound*, a *Shilling*, &c. may be divided into 10, 100, 1000, 10000, &c. equal Parts at Pleasure.

Reduction of Decimals.

to reduce a given *Vulgar Fraction* to a *Decimal*, that shall be equivalent thereto.

When in any *Arithmetical Operation* your Work is mingled with *Vulgar Fractions*, as to render it tedious or difficult, the best Remedy you can have, is to reduce your *Vulgar Fraction* or *Fractions* into a *Decimal*.

H

Decimal or *Decimals*, which having done, the Work will be as easie in every respect, as if you had to do with nothing but whole Numbers, which you may effect by the following Proportion, viz. as the *Denominator* of the given *Vulgar Fraction* is to its *Numerator* so is an Unit with so many Cyphers as you intend your *Decimal* shall have Places, to the *Decimal* required.

So if the *Fraction* to be reduced were $\frac{3}{4}$, and you would reduce it to a *Decimal* consisting of 4 Places I say the Proportion is

As 4 (the *Denominator* of the given Fraction.)
Is to 3 (its *Numerator*.)

So is 10000 (the *Denominator* of the *Decimal* required)
To 7500. (the *Decimal* required.)

So that I conclude, $\frac{3}{4}$ will be reduced to its equivalent *Decimal* .7500 or .75 for Cyphers on the right Hand of a *Decimal*, do neither increase nor diminish its Value.

Now according to the aforesaid Proportion is evident, That if to the *Numerator* of any *Fraction* given to be reduced to a *Decimal*, you annex as many Cyphers as you intend its equivalent *Decimal* shall have Places, and divide it by its *Denominator*, the *Quotient* will be the *Decimal* required. See the Work of the former *Fraction*.

Denominator	————	Numerator	————	Decimal
4	————	3	————	10000

3	
4)30000	(.7500 the <i>De</i>
28	fought, or
20	or which
20	all one,
00	100, or of
00	is 15 s.
00	
00	

Of Decimal Fractions.

147

What is the $\frac{1}{8}$ in a Decimal Fraction?

Denominator	Numerator	Decimal
8	1	1000

Ans. .125 the Decimal sought.

Here followeth the Decimal Tables in Reduction.

Of English Money, the Integer being a Pound.

Shillings. Decimal of a l.

19.95
18.9
17.85
16.8
15.75
14.7
13.65
12.9
11.55
10.5
9.45
8.4
7.35
6.3
5.25
4.2
3.15
2.1
1.05

Pence with Decimal of a l
things.

d. .0489583
.0479166
.046875
11. .0458333
.0447916

.04375
.0427082
10. .0416665
.040625
.0395833
.0385416
9. .0375
.0364583
.0354166
.034375
8. .0333333
.032296
.03125
.0302083
7. .0291666
.028125
.0270833
.0260416
6. .025
.0239583
.0229166
.021875
5. .0208333
.0197916
.01875
.0177708
4. .0166666
.015625
.0145833
.0135416

H 2

3

148 Of Decimal Fractions.

Pence, Farth. Decimal of a l.

3	.0125
	.0114583
	.0104166
	.009375
2	.0083333
	.0072916
	.00625
1 Penny 1 Far.	.0052083
	.0041666
3 Farthings	.003125
2 Ditto	.0020833
1 Ditto.	.0010416

Of Troy-Weight, the Integers being an Ounce.

Pennyweights Dec. of an Oz.

19	.95
18	.9
17	.85
16	.8
15	.75
14	.7
13	.65
12	.6
11	.55
10	.5
9	.45
8	.4
7	.35
6	.3
5	.25
4	.2
3	.15
2	.1
1	.05

Grains Dec. of an O

23	.0479166
22	.0458333
21	.04375
20	.0416666
19	.0395833
18	.0375
17	.0354166
16	.0333333
15	.03125
14	.0291666
13	.0270833
12	.025
11	.0229166
10	.0208333
9	.01875

Grains Dec. of an

8	.0166666
7	.0145833
6	.0125
5	.0104166
4	.0083333
3	.00625
2	.0041666
1	.0020833

Averdupoize great We
the Integer being
Hundredweight, to
112 lb.

Quarters of 1 Hundred.	Decimals Hundred
	3.75
	2.5
	1.25

Of Decimal Fractions.

149

Pounds Decim. of 1 C.

27.2410714

26.2321428

25.2232142

24.2142857

23.2053571

22.1964285

21.1875

20.1785714

19.1696428

18.1607142

17.1517857

16.1428571

15.1339285

14.125

13.1160714

12.1071428

11.0982142

10.0892857

9.0803571

8.0714285

7.0625

6.0535714

5.0446428

4.0357142

3.0267857

2.0178571

1.0089285

Ounces. Decim. of 1 C.

15.0083705

14.0078125

13.0072544

12.0066964

11.0061383

10.0055803

9.0050223

Ounces Decim. of 1 C.

8.0044642

7.0039062

6.0033482

5.0027901

4.0022321

3.0016741

2.0011160

1.0055580

Qrs of an Oz. Decim. of 1 C.

3.0004185

2.0002790

1.0001395

Averdupoize little Weight,
Integer being a Pound.

Ounces Decim. of 1 lb.

15.9375

14.875

13.8125

12.75

11.6875

10.625

9.5625

8.5

7.4375

6.375

5.3125

4.25

3.1875

2.125

1.0625

Drams Decim. of a lb.

15.05859375

14.0546875

H 3

13

Of Decimal Fractions.

Drains Decim. of 1 lb. Of Dry-Measure, the Integer being a Quarter.

13.	05078115
12.	046875
11.	04296875
10.	0390625
9.	03515625
8.	03125
7.	02734375
6.	0234375
5.	01953125
4.	015625
3.	01171875
2.	0078125
1.	00390625

Bushels Dec. of a Qter.

7.	875
6.	75
5.	625
4.	5
3.	375
2.	25
1.	125

Pecks Dec. of a Qter.

3.	09375
2.	0625
1.	03125

Qrs of 1 Dram Decim. of 1 lb

3.	0029295
2.	0019531
1.	0009765

Qter of a Peck Dec. of a Qter.

3.	0234375
2.	015625
1.	0078125

Of Liquid-Measure, the Integer being a Gallon.

Pints Dec. of 1 Gall.

7.	875
6.	75
5.	625
4.	5
3.	375
2.	25
1.	125

Pints Dec. of a Qter.

3.	005859
2.	003906
1.	001953

Of Long-Measure, 1 Yard or 1 Ell being the Integer.

Quarter of 1 Decimals of *Qtrs*

Qrs. of a Pint Decim. of a Gal

3.	09375
2.	0625
1.	03125

Yard or 1 Ell Yard or 1 Ell.

3.	75
2.	5
1.	25

Nails

Of Decimal Fractions.

151

Decimals of 1 Of Dozens, the Integer
Nails Yard or 1 Ell. being a Gross.

3.1875

2.125

1.0625

Quarters of Decimals of 1
Nail. Yard or 1 Ell

3.046875

2.03125

1.015625

Of Reduction of Inches,
&c. into Decimals, the
Integer being a Foot in
length.

Inches Decimals of a
Foot.

11.9166666

10.8333333

9.75

8.6666666

7.5833333

6.5

5.4166666

4.3333333

3.25

2.1666666

1.0833333

Parts of a Doz. Dec. of a Gross

11.076388

10.069944

9.0625

8.055555

7.048611

6.041666

5.034722

4.027777

3.020833

2.013888

1.006944

Of Time, a Day being the
Integer.

Hours Decim. of a Day

23.9583333

22.9166666

21.875

20.8333333

H 4.

19

Hours Dec. of a Day.

19	.7916666
18	.75
17	.7083333
16	.6666666
15	.625
14	.5833333
13	.5416666
12	.5
11	.4583333
10	.4166666
9	.375
8	.3333333
7	.2916666
6	.25
5	.2083333
4	.1666666
3	.125
2	.0833333
1	.0416666

Minutes Dec. of a Day.

59	.0409722
58	.0402777
57	.0395833
56	.0388888
55	.0381944
54	.0375
53	.0368055
52	.0361111
51	.0354166
50	.0347222
49	.0340277
48	.0333333
47	.0326388
46	.0319444
45	.0312500

Minutes Dec. of a Day.

44	.0305555
43	.0298611
42	.0291666
41	.0284722
40	.0277777
39	.0270833
38	.0263888
37	.0256944
36	.0249999
35	.0243055
34	.0236111
33	.0229166
32	.0222222
31	.0215277
30	.0208333
29	.0201388
28	.0194444
27	.01875
26	.0180555
25	.0173611
24	.0166666
23	.0159722
22	.0152777
21	.0145833
20	.0138888
19	.0131944
18	.0125
17	.0118055
16	.0111111
15	.0104166
14	.0097222
13	.0090277
12	.0083333
11	.0076388
10	.0069444
9	.00625

Of Decimal Fractions.

153

Minutes	Dec. of a Day.
8	.0034722
7	.0048611
6	.0041666
5	.0034722

Minutes	Dec. of a Day
4	.0027777
3	.0020833
2	.0013888
1	.0006944

To reduce the known Parts of Money, Weight, Measure, Time, &c. to Decimal Fractions.

Hence it is evident, that the known Parts of *Money, Weight, Measure, Time and Motion, &c.* may be reduced to *Decimal Fractions* of the same Value or infinitely near it; for if in *Money*, a *Pound Sterling* be an *Integer*, whatsoever is less than a *Pound*, is either a *Part* or *Parts* of the same; and when you know what *Part* or *Parts* thereof it is, you may reduce it to a *Decimal* of the same Value, as in the Examples following.

But because it sometimes happens, that a Cypher or more is to possess the First, Second, &c. Places of the *Decimal* toward the Left Hand, therefore take this Rule.

As many Cyphers as you have in the Third Number of the 3 in proportion as in this Example: What is the $\frac{1}{8}$ in a *Decimal Fraction*, so many Places you must prick off in the *Quotient* towards the Right Hand.

8. ————— I ————— Iooo

$$\begin{array}{r} \text{I} \\ 8 \overline{) 1000(.125)} \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 00 \end{array}$$

H 5

How is 9 d. express'd in the *Decimal* of a *Pound*?

R U L E, Consider that in a *Pound* are 240 *Pence*, therefore 9 d. is $\frac{9}{240}$ in a *Vulgar Fraction*, for 9 d. is $\frac{3}{80}$ of $\frac{1}{10}$ of a *Pound*.

Then say as in the last Example, and that will shew in the *Quotient* what Part of a *Pound* 9 d. is in the *Decimal*, as you may find it in the Table.

d.	d.	Decimals
240	9	10000
		9
		—————
		240)90000(.0375
		72
		—————
		180
		168
		—————
		120
		120
		—————
		000
		—————

In the last Example because I had 4 Cyphers in the Third Number, therefore I must prick 4 Places off toward the Right Hand in the *Quotient* for *Decimals*; but because the said *Quotient* did but consist 3 Places, therefore I supply the Fourth toward the Left Hand with a Cypher.

N O T E, That the greater your Third Number is in the Stating, the nearer do you bring your *Decimal* to Truth, when any Thing happens to main as in the Examples following; but in many Cases where the *Decimal* is not to be multiplied a great Number, it is sufficient that the Third Number be 1000.

But when you reduce $\frac{1}{4}$ or $\frac{1}{2}$ or $\frac{3}{4}$ to *Decimals*, or any Number of *Shillings* to the *Decimal* of a *Pound*, it is sufficient in these Cases if your Third Number be 100.

If you find any Question in any Author that the *Decimal* does not answer your Answer in the Table, you must add as many Cyphers to the Right Hand of your Third Number, as there are Figures wanting in the *Quotient*, to make the *Quotient* even to the Answer of the Table.

And if any Thing remains at any *Division*, it is inconsiderable, being less than $\frac{1}{1000}$ Part of an Unit or 1.

How is 3 *Farthings* wrote in the *Decimal Fraction* of a *Pound Sterling*, the Fraction $\frac{3}{200}$.

Farthings in a l. Farthings Decimal
960 ————— 3 ————— 1000000

3 *Decimal of a l.*

$$\begin{array}{r} 960 \overline{) 3000000} .003125 \\ 2880 \end{array}$$

1200

960

2400

1920

4800

4800

0000

There is 6 Cyphers in the *Dividend*, and but Figures in the *Quotient*, which is the *Decimal* of *Pound*, I add (as before is mentioned) 2 Cyphers to the Left Hand in the *Quotient*, to make the *Quotient*

156 [Of Decimal Fractions.

tient consist of as many Places as there are Cyphers in the *Dividend*. See the Proof in the Table.

The Answer in this *Decimal Question*, is .003125 or 3125 Millions Parts of a Pound.

How is 13 Shillings in the *Decimal* of a Pound? In a *Vulgar Fraction* 13 is $\frac{13}{20}$ ths, and in a *Decimal* 65 Hundred Parts of a Pound.

s.	s.	Decimal.
20	13	100

Answer, .65 Hundred Parts of a Pound

How is 14 s. 6 d. in the *Decimal* of a Pound? In 14 s. 6 d. are 174 d. the *Decimal* of 14 s. is 7 tenths Parts of a Pound, and the *Decimal* of 6 d. is .025 Thousand hundred Parts of a Pound, which added together make .725, as in the Table aforegoing.

The *Fraction* $\frac{174}{240}$.

240	174	1000
-----	-----	------

Answer, .725 Thousand Hundred Parts

How is 7 Shillings in the *Decimal* of a Pound?

Shill.	Shill.	Decimals
20	7	100

Answer, .35 Decimals of 1 Pound, as in the Table

How is 3 d. in the *Decimal* of a Pound?

3 d. is the $\frac{3}{12}$ of $\frac{1}{10}$ or $\frac{3}{40}$; then say,

d.	d.	Decimals
240	3	10000

Answer, .0125 of 1

Likewise if there were given 7 s. 3 d. to find the *Decimal* thereto, 7 s. 3 d. is 87 d. which is $\frac{87}{240}$ of 1 and the *Decimal* thereto will be found to be .3625 l.

d.	d.	Decimal.
240	87	10000

Answer, .3625 of a Pound.

Or if you had added the foregoing *Decimals* together, you would have had the same *Product*.

1.
 .35 *Decimal* of 7 s.
 .0125 *Decimal* of 3 d. makes
 .3625 whole *Decimal*.

Ho

Of Decimal Fractions.

157

How is 15 Ounces in the Decimal of a Pound expressed (1 lb. is 16 Ounces) Fraction $\frac{15}{16}$ Averdupoize little Weight?

oz.	oz.	Decimals.
16	15	10000

Answer, .9375 Decimals of a lb.

How is 7 lb. expressed in the Decimal of a Hundred weight, Fraction $\frac{7}{112}$?

112 lb — 7 lb — 10000 Decimals supposed:

Answer, .0625 Decimal of 1 Hundred-weight:

How is 59 Minutes expressed in the Decimal of a Day? I consider there is 1440 Minutes in 1 Day, the Fraction is $\frac{59}{1440}$ of a Day.

1440 Min. — 59 Min. — 10000000 Decimals.

Answer, .0409722 Decimals equal to 59 Minutes. 320 remains, which is less than the $\frac{320}{10000000}$ Part of an Unit or 1.

How is 11 Inches expressed in the Decimal of 1 Foot? Fraction $\frac{11}{12}$ of 1 Foot.

12 Inch. 1 Foot. — 11 Inches — 10000000 Dec. of 1 Foot.

Answer, .9166666 — 8 Remains, which is less than $\frac{8}{10000000}$ of an Unit or 1

How is 23 Hours in a Decimal of a Day?

Fraction $\frac{23}{24}$ of a Day.

24 Hours in 1 Day — 23 Hours — 10000000 Decimal.

Answer, .9583333 Decimals of a Day.

How is 15 Pennyweights expressed in the Decimals of an Ounce?

20 pwt. in 1 oz. — 15 pwt. — 100 Decimals.

Answer, .75 Decimal.

How is 23 Grains expressed in the Decimal of 1 Ounce, 480 Grains in 1 Ounce?

480 Grains — 23 Grains — 10000000 Decim.

Answer, .0479166 Decimals.

How is 3 Nails expressed in the Decimal of a Yard? The Fraction $\frac{3}{16}$.

16 Nails — 3 Nails — 10000 Decimals

Answer, .1875 Decimals of 3 Nails.

How

158 Of Decimal Fractions.

How is 3 Pecks in the Decimal of a Quarter?

Fraction $\frac{3}{32}$.

32 Pecks in 1 Qter.—3 Qter.—100000 Decimals.

Answer, .09375 Decimal of 3 Pecks.

How is 7 Bushels expressed in the Decimal of a Quarter, 8 Bushels 1 Quarter? Fraction $\frac{7}{8}$.

8 Bushels.—7 Bushels.—1000 Decimals.

Answer, Decimal. 175 of 7 Bushels.

How is 14 Drams expressed in the Decimal of a Pound-weight, 256 Drams in a Pound-weight?

256 Drams.—14 Drams.—10000000 Decim.

Answer, .0546875 Decimals of 14 Drams.

How is $\frac{3}{4}$ of a Dram expressed in the Decimal of a Pound? Fraction, $\frac{3}{1024}$.

256 Drams.

4 Quarters

	Qters	Decimals.
1024	3	10000000

Answer, .0029296 Decimals of $\frac{3}{4}$ of a Dram

896 remains, which is less then $\frac{896}{10000000}$ of 1 Unit.

How is $\frac{3}{4}$ of an Inch expressed in the Decimal of a Foot, 48 Quarters in a Foot?

48 qrs.—3 qrs.—10000 Dec.

Answer, .0625 Decimals of $\frac{3}{4}$ of 1 Inch.

How is 7 Pints expressed in the Decimal of 1 Gallon

Fraction $\frac{7}{8}$.

8 Pints.—7 Pints.—1000 Decimals

Answer, .875 Decimals of 7 Pints.

How is 2 Quarters expressed in the Dec. of 1 Yard

4 qrs.—2 qrs.—10 Decimals.

Answer, .5 Decimal of 2 Quarters.

8 Bushels

4 Pecks

How is $\frac{3}{4}$ of a Peck expressed in the Decimal of a Quarter?

32 ditto

4 Quarters

128 — 3 — 10000000 Decim.

Answer, .0234375 of $\frac{3}{4}$ of a Peck.

Of Decimal Fractions.

159

128 Qtrs of a Peck in 4 Pints (8 Bush. How is 3 Pints expressed in the Decimal of a Quarter or 8 Bushels?

5 2 Pints ——— 3 Pints ——— 100000 Decimals.
 Answer, .05859 Decimals of 3 Pints of 1 Quarter.
 And 92 remains, which is less than $\frac{1}{10000}$ of 1 Unit.
 How is 11 Dozen expressed in the Decimal of a Gross?
 Fraction $\frac{11}{12}$ of a Gross.

12 Gross ——— 11 Dozen ——— 10000000 Decim.
 Answer, Decimal .9166666 remains 8.
 12 Dozen How is 11 Parts of a Dozen
 12 Parts in 1 Dozen expressed in the Decimal
 of a Gross?

144 Parts ——— 11 Parts ——— 10000000 Decimals.
 Answer, .0076388.

How is 6 Ounces 12 Pennyweight expressed in the
 Decimal of a Pound Troy?

6 oz. 12 pwt.
 20 pwt. pwt pwt Decimal.
 240 ——— 132 ——— 100

of 32 Pennyweights
 — Fractions

De 240 ditto in a lb Troy. Answer, .55 Decimal of a lb.
 How is 12 lb. expressed in the Decimal of 1 C. or
 112 lb? The Vulgar Fraction is $\frac{112}{1000}$, therefore work
 as before.

112 lb ——— 12 lb ——— 10000 Decimals
 Answer, .1071 Decimals of a lb. 48 remains,
 which is inconsiderable, being less than $\frac{1}{10000}$ Part of an
 Unit.

How is 7 Farthings expressed in the Decimal of a
 Pound? Fraction $\frac{7}{16}$.

960 Farth. ——— 7 Farth. ——— 10000000 Decimals
 Answer, .0072916 Decimals of a Pound, according
 to the Table. Remains 540, which is less than
 $\frac{1}{1000000}$ Part of an Unit.

NOTE

NOTE, That you may by the Rule following write down any Number of *Shillings* in the *Decimal* of a *Pound* without any Proportion.

R U L E. If your *Shillings* are an even Number half of them is the *Decimal* of a *Pound*, but if they are odd, put a Cypher to the Right Hand, and then the half is the *Decimal* of a *Pound*, 14 s. in 7 l. 16 s. is 8 l. &c. likewise 13 s. or 130 is 65 l. 15 s. or 150 is 75 l. &c.

You may likewise write down any Number of *Pence* or *Farthings* in the *Decimal* of a *Pound*, without working by the foregoing Rules.

For if you reduce the given *Pence* into *Farthings*, and place a Cypher to the Left Hand, you have the *Decimal* of a *Pound* required; but if the said *Farthings* exceed 14, you may add one (for Reason given in the next Case) and another, for each 39 *Farthings*.

Example for Pence.

d.	Deci.	d.	Deci.
3	is .012 l.	9	is .037 l. &c.

To find the Value of a *Decimal* in the known Parts of Money, Weight, Measure, &c.

Multiply the *Decimal* given, by such a Number *Units* of the next inferior Denomination, as make a *Unit* of that your *Decimal* is of, and prick from the Right Hand of the *Product*, so many Places your *Decimal* consisteth of; so those towards the Left Hand the said Point or Prick are *Integers*, and those to the Right Hand, are Parts of a *Unit* those *Integers*.

MONE

M O N E Y.

<i>Decimal</i> 35 l. 20 Shil.	<i>Decimal</i> .7635 l. 20	<i>Decimal</i> 0072916 l. 20 s.
<i>Skill.</i> 7 00	<i>Skill.</i> 5 2700 12	0.1458320 12 d.
<i>Pence</i> 3 2400		d. 1 7499840 4
<i>Parts of a Penny.</i>		<i>Far.</i> 2 9999360

In this Example you see, That the Value of 0072916 is 1 d. $\frac{1}{2}$, and the Parts being another Farthing, wanting less than an Hundredth Part of a Unit, you may call the Value 7 Farthings.

W E I G H T.

<i>Decimal</i> .1071 Hund. weight 4 Quarters	<i>Decimal.</i> .0029296 Pounds 16 Ounces
4284 28 Pounds	0175776 0029296
34272 8568	0.0468736 16 Drams
11 9952 Mind the last Question on other Side, it wanting less than the Hundred part of 1 Unit, you may call it 12 Pound.	2812416 0468736 0.7499776 4 qrs of D.
12 Pound.	qrs 2 9999104 it want- ing less than 1 Hundred Part of 1 Unit, it may be called 3 Quarters of 1 Dram.

Decimal

TROY WEIGHT.

Decimal
 .0479166 Ounces
 480 Grains

 in 10z.
 38333280
 1916664

 Grains 22|9999680

It wants not the Hundredth Part of 1 Unit, so that you may call it 23 Grains,

Decimal
 .75 Ounces
 20 Penwts 1 Oz.

 Penwts 15|00

Decimal
 .55 Pounds
 12 Ounces

 Ounces 6|60
 20

 pwt 12|00

T I M E.

Decimal
 .9583333 Day
 24 Hours

 38333332
 19166666

 Hour 22|9999992

It wants not the Hundredth Part of 1 Unit, and you may call it 23 Hours

Decimal
 .0409722 Day
 1440 Min.

 16388880
 1638888
 409722

 Min. 58|9999680

It wants not the Hundredth Part of 1 Unit, and you may call it 59 Minutes

D R Inches

DRY MEASURE.

Decimals
 .0234375 Quarters
 8 Bushels

1875000
 4 Pecks

7500000

4 qtrs of
 Peck

3'0000000

Decimals
 .005859 Quarters
 512 Pints

011718

005859

29295

Pints 2|999808

It's less than 1 Hundred
 Part of a Unit, therefore
 you may call it 3 Pints.

LIQUID MEASURE.

Decimals
 .875 Gallons
 8

Pints 7 000

LAND MEASURE.

Decimal
 .9166666 Feet
 12 Inches

10 9999992

It's less than the Hun-
 dth Part of 1 Unit, and
 before you may call it

Inches.

Decimal
 .0625 Foot
 48 Qtrs of an
 Inch in 1

5000 Foot

2500

Inch
 qrs of 1--3|0000

There

EXAMPLE.

What is the Value of .8896 l.

The first Figure (8) being doubled makes 16, and because the next Figure is above 5, I add one to 16, which makes 17 s. then the Excess of the Second Figure above 5 being 3, I esteem it so many Tens; and the Figure 9 in the Third Place being Units makes 39, which being lessened by one makes 38 Farthings, which is 9 d. $\frac{1}{2}$, so is 17 s. 9. $\frac{1}{2}$ the Value of the given *Decimal* .8896 l. and after this Manner may the Value of any *Decimal* of a Pound Sterling be discovered at first Sight without Loss of a Farthing. *Decimal* .8896 l.

$$\begin{array}{r}
 20 \\
 \hline
 \text{shil. } 17 \overline{) 7920} \\
 \underline{12} \\
 \hline
 \text{d. } 9 \overline{) 5040} \\
 \underline{4} \\
 \hline
 \text{Far. } 20160 \\
 \hline
 \end{array}$$

A D D I T I O N.

There is no Difference between *Addition* of *Decimals* and whole Numbers of one Denomination, only observing the *Decimals* Point under Point, as in the Examples, and prick so many of the Sum, as are in the greatest Number of Places in the *Decimal* given.

GENERAL RULE.

When Two or more *Decimals* are given to be added together, you are so to dispose of them one under

der the other, as that all the Figures on the Left Hand may stand in Order one under the other; that is to say, *Primes* under *Primes*, or *Tens* under *Tens*, (whether they be Cyphers or significant Figures) and *Seconds* or *Hundreds* under *Seconds* or *Hundreds*, &c. observe the same Order if they consist of never so many Places, and others of never so few.

E X A M P L E S.

<i>Decimals</i>	<i>Decimals</i>	<i>Decimals</i>
.00746	.987	.3946
.0832	.3642	.0013
.62	.853	.99
.8	.9761	.176
Integer 1.51066 Parts of an Integer or 1	Int. 3.1803	Int. 1.5619

The First Example towards the Left Hand is the rest, only I demonstrate the working; First, put 6 under the Line, because there is no other Figure or Number to add to it; then I proceed and say 2 and 4 make 6, which I put under the Line; then I say 3 and 7 make 10, so I set down an 0, and carry 1 to the next; say 1 that I carry and 2 and make Eleven, for which I set down 1, and carry 1 saying one that I carry and 8 and 6 make 15, which I put in its Place under the Line, because it is the last, and because the Figure 5 standeth under the Place of *Primes*, I put a Point before it, that is to say, between 2 and 5 and the Work is done, the Number 1 being an *Integer*, and the rest a *Decimal*. Whereby I find the Sum to be 1.51066, that is 1 *Integer*, or 1 and 51066 Parts of an *Integer*, so all the rest of the Examples.

Of Decimal Fractions. 167

Int.	Decimals
4	.368 l.
16	.07 l.
26	.009 l.
42	.8 l.

Inte.	Decimals
748	.
36	.72 l.
9	.564 l.
	.7358 l.

Pounds 89 .247 Decim. of 1 l. l. 795 .0198 Dec.

You see the working of these mixt *Additions*, the *Integers* are *Pounds Sterling*, and the *Decimals*, *Pounds*, which being worked according to the Rules in *Reduction*, would be found to be *Shillings*, *Pence*, and *Farthings*; as for Example, The First Sum towards the Right Hand is *l. 89. 247 l.* or *Decimal Parts of 1 l. Sterling.*

247 l. which is 89 l. 4 s. 11 d. $\frac{1}{4}$
20.

Skill. 4 940
12

Pence 11 280
4

Farthings 11 20

Subtraction of Decimals.

Place your Numbers as in the last, and proceed as in *Addition*.

E X A M P L E.

Decimal	l. Decimal	l. Dec.
Lent .728 l.	Lent 160 .99 l.	Lnt 389.0
Paid .648	Paid 94 .8462 l.	Paid 0.346
<u>Remains. 80 l.</u>	<u>Rem. 66 .1438</u>	<u>Re. 388.654</u>

When

When the *Decimal* given to be substracted does not consist of an equal Number of Places, such Defect must be supplied by annexing Cyphers, or supposing as many Cyphers to be annexed (as are wanting) on the Right Hand, and then the Work will be as in the former Examples.

Let it be required to substract .2784 *Decimal* from .3479 *Decimal*.

Substract 15.486 from .64 l.

l. Decimals		Decimals		l. Decim.	
64	.000	Lent	.3479 l.	Lent 84	.6
15	.486	Paid	.2784 l.	Paid 15	.0752
Rem. 48	.514	Rem.	.0695	Rem. 69	.5248

Multiplication of Decimals.

In this Rule you are to place the Factors, and work as in whole Numbers; but after you have found the *Product*, observe this General Rule.

As many *Decimal Places* as you have in both the Factors, so many Places must you prick off toward the Right Hand of the *Product*; and if so many Places happen not to be contained in the said *Product* (as it will happen when you multiply Two *Fractions* together that are of little Value) you are to make up the Number by Cyphers towards the Left Hand.

The Reason of this Rule is plain, it differing nothing from that given for multiplying *Vulgar Fractions*; for by multiplying the Sums given together you multiply the *Numerators*; and by cutting off as many as are in both *Decimals* given, you multiply the *Denominators* and divide that of the *Numerators* by the *Product* of the *Denominators*: Thus, to multiply

tip

multiply $\frac{1}{2}$ by $\frac{3}{4}$ is the same as .75 by 5, and 100 by 10, viz. $\frac{75}{100}$ by $\frac{5}{10}$; for 5 times 75 is 375, and 10 times 100 is 1000; so the *Product* by the $\frac{3}{4}$ or 375.

Look how many *Decimal Places* are in both the *Factors*, viz. *Multiplicand* and *Multiplier*, so many *Decimal Places* must be in the *Product*.

Wherefore cut off so many *Figures* from the *Right hand* of the *Product* for *Decimals*, and the *Figure* or *Figures* remaining on the *Left-hand* (if there be any) are *Integers*.

Now observe as many *Decimals* as you have in the *Multiplicand* and *Multiplier*, so many must you cut off toward the *Right-hand*, as in this *Example*: You find I had 5 *Figures*, as before is told, and so many I cut off. See the *Work*.

$$\begin{array}{r} \text{Multiply } 3.467 \\ \text{by } 19.01 \\ \hline 3467 \\ 31203 \\ 3467 \\ \hline \end{array}$$

Integer 65.90767 *Decimal*.

A whole Number 36492
by a Decimal .032

$$\begin{array}{r} 72984 \\ 109476 \\ \hline \end{array}$$

Int. 1167.744 *Dec.*

A Decimal .13461
by a whole Number 42

$$\begin{array}{r} 26922 \\ 53844 \\ \hline \end{array}$$

Int. 5.65362 *Dec.*

Now in this *Example* there is more *Decimal Places* in the *Multiplicand* and *Multiplier* than in the *Product*. Therefore I annex a *Cypher* toward the Left-hand to make it consist of as many Places as is before express'd. See the Work.

$$\begin{array}{r}
 .1264 \text{ Decimals} \\
 .247 \\
 \hline
 8848 \\
 5056 \\
 2528 \\
 \hline
 .03122.08
 \end{array}$$

$$\begin{array}{r}
 .01832 \text{ Decim.} \\
 .007 \\
 \hline
 .00012824 \text{ as in the} \\
 \hline \hline \text{last.} \\
 .048 \text{ Decimals} \\
 .12 \\
 \hline
 .00576
 \end{array}$$

Division of Decimals.

Division is the same with that of whole Numbers. All the Difficulty thereof is, to know how many *Decimal Places* to prick off towards the Right-hand in the *Quotient*; for which take this Rule.

Take notice how many *Decimal Places* you have in the *Dividend*, and how many in the *Divisor*, and find how many the difference is; so many Places may you prick off to the Right-hand of the *Quotient*, but if so many Places are not in the *Quotient* as the difference, make up the Number by prefixing *Cyphers* toward the Left-hand.

Decimal Fractions may also be divided as vulgar Fractions. $\frac{75}{100}$ by $\frac{125}{1000}$ quotes $\frac{75000}{125000}$, or 6.

Note, That in the following and most other *Examples* in *Division of Decimals*, it will be necessary to prefix *Cyphers* toward the Right-hand of the *Dividend*, so that you may know what Number of *Cyphers* to prefix to the Right hand of any *Dividend*, observe the Rule following.

Of Decimal Fractions.

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Dividend Divisor
Divide 12.43210 by 9.465

A mixt Number given to be divided by a mixt Number.

$$\begin{array}{r}
 \text{Int. Dec.} \\
 9.465 \overline{) 12.43210} \quad (1.31 \\
 \underline{9.465} \\
 29671 \\
 \underline{28395} \\
 12760 \\
 \underline{9465} \\
 3295
 \end{array}$$

Remains being less then the $\frac{1}{1000}$ Part of 1 Unit.

GENERAL RULE.

After the Work of the *Division* is ended, consider how many *Decimal Places* are in the *Dividend* more than there are in the *Divisor*; and how many soever the Excess is, let so many in the *Quotient* be separated from the rest for a *Decimal*. But if there are not so many Figures in the *Quotient* as the said Excess is, such Defect must be supplied by prefixing as many *Cyphers* on the Left-hand, putting a Point before them, as hath been said already, then such *Decimal* as aforesaid will be the true Value of the *Quotient* sought.

RULE, Consider how many *Decimal Places* you would have in the *Quotient* (as 3 is sufficient, if it is afterward to be multiplied by any thing) and also how many *Decimal Places* you have in your *Dividend*; and so many as you have in both, make so many *Decimal Places* in the *Dividend* by adding *Cyphers*, as need require, as in the following Example; where 16 is divided by 1.47, and because I would have

3 *Decimals* in the *Quotient*, and there are 2 in the *Divisor*, I must make 5 *Decimal Places* in the *Dividend*, by prefixing to the Right-hand of the *Dividend* 3 *Cyphers*.

A mixt Number by a mixt Number.

Int. Decimal

$$1.47 \overline{) 3.46000} \quad (2.353$$

$$2.94$$

$$520$$

$$441$$

$$790$$

$$735$$

$$550$$

$$441$$

$$109$$

Remains being less than the 1000th part of an Unit.

A Decimal Table.

I shall explain this Rule by the following Examples of the several Cases, as may happen in the Division of Decimals, which are 9 as followeth.

1	A whole Number	being given to be divided by	a whole Number.
2			a mixt Number.
3			a Decimal Fraction.
4	A mixt Number		a whole Number.
5			a mixt Number.
6			a Decimal Fraction.
7	A Decimal Fraction		a whole Number.
8			a mixt Number.
9			a Decimal Fraction.

Of Decimal Fractions. 173

A whole Number given to be divided by a whole Number.

Divide 5729 by 438.

When you are to divide one whole Number by another, and they are not commensurable, tho' there are no *Decimals* in either the *Dividend* or the *Divisor*; yet if you annex a competent Number of *Cyphers* to the *Dividend*, there will be a *Decimal* in the *Quotient* consisting of as many Places as you annexed *Cyphers* to the *Dividend*.

Divisor Dividend Quotient
Int. Decimal

438) 5729.0000 (13.0799
438

1349
1314

350
000

3500
3066

4340
3942

3980
3942

58

Now to find out the Value of the *Quotient* by the General Rule foregoing, I consider there are no *Decimals* in the *Divisor*, but there are 4 in the *Dividend*, and consequently by the said Rule there must be 4 *Decimal* Places noted out in the *Quotient* by setting a Point before them, and then the true Value of

I 3 the

174 *Of Decimal Fractions.*

the *Quotient* will be found to be 13 *Integers* 0799 Parts of an *Integer*.

A whole Number given to be divided by a mixt Number.

<i>Divisor</i>	<i>Dividend.</i>	<i>Quotient.</i>
<i>Int.</i>		<i>Int. Decimal.</i>

39.4865)	586.000000	(14.84
----------	------------	--------

	394865	
--	--------	--

	1911350	
--	---------	--

	1579460	
--	---------	--

	3318900	
--	---------	--

	3158920	
--	---------	--

	1599800	
--	---------	--

	1579460	
--	---------	--

19340 Remains.

The Excess of the *Dividend* being 2 Figures more than the *Divisor*, I cut off 2 Figures in the *Quotient* for the *Decimals*, and it is found to be 14 *Integers* and .84 *l. Decimals* with Remainder 19340, which is less than the $\frac{1}{10} \times \frac{2}{10} \times \frac{3}{10} \times \frac{4}{10}$ part of 1 *Integer*.

Let there be 2 given for a *Dividend* to be divided by the mixt Number 28.74. to make up the *Dividend* I annex 6 Cyphers, and work as before.

E X A M P L E.

Quotient.

28.74)2.000000(.0695 *Decimals.*

Now to find the true Value of this *Quotient* according to the General Rule. The Excess is 4 *Decimals* in the *Dividend* more than in the *Divisor*, there must be 4 *Decimals* in the *Quotient*, but there is but 3; therefore I make 4 by putting a Cypher to the Left-hand; as you may see in the *Quotient* aforegoing

There being 5 *Decimals* in the *Dividend* and none in the *Divisor*, I note off 5 in the *Quotient*. See the Work aforegoing.

A *Decimal Fraction* given to be divided by a whole Number.

Fraction. Quotient.

25) .07864 (.00314

But there should be 5 *Decimal Places*, therefore I annex 2 *Cyphers*.

A *Decimal Fraction* given to be divided by a mixt Number.

Mixt Number. Decimal. Decimals.

3.476) .846000 (.2433

A *Decimal Fraction* given to be divided by a *Decimal Fraction*.

Decimal.

.243) .835796 (.3439

The Rule of Three in Decimal Fractions.

In the *Rule of Three in Decimals*, the Operation is in every Respect the same as in whole Numbers, so is it in all the Parts or Rules of *Arithmetick*; only when you work in *Decimals*, you must have respect to the *Decimal Rules* before taught; for in *Decimals* you must add, subtract, multiply and divide, when and after the same manner as you do in whole Numbers. A few Examples will make you perfect in the Knowledge thereof.

If 1 lb. $\frac{3}{4}$ of Tobacco cost 2 s. 6 d. how much will 326 lb. $\frac{1}{4}$ cost at that Rate?

When the Fractional Parts of the Numbers in the Question are turned into *Decimals*, then it will read thus.

If 1.75 lb. of Tobacco cost 3.5 s. how much will 326.25 lb. of the same cost at that Rate.

lb.	s.	lb.
If 1.75	3.5	326.25
		3.5
		163125
		97875
		l. s.
1.75)	1141.875	(652.5
	1050	12
	918	d. 6.0 dec.
	875	
	437	
	350	
	875	
	875	
	0	

Or 32 — 12 — 6 the same as in whole Numbers.

You must take care to cut off the *Decimals* in *Multiplication* and *Division*, as *aforesaid*.

IF

If 9 C. of Tobacco cost 25 l. 7 s. what will be the Price of 17 C. of the same at that Rate?

C.	l.	C.
If 9	25.35	17
	17	
	17745	
	2535	
	1. Decimal.	
	9) 430.95 (47.880	
	36	
	70	
	63	
	79	
	72	
	75	
	72	
	3	

By prefixing a Cypher to the *Decimal*, I find it to be 17 s. 8 d.

Answer, 47 l. 17 s. 8 d.

Of Decimal Fractions.

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If an Ounce of Gold be worth 2 l. 19 s. 4 d. I demand the Price of 19 oz. 3 pwt. 5 gra. at that Rate.

First find the *Decimals* of the Numbers in the Question.

oz. pwt. gra.
19 ——— 3 ——— 5

The *Decimal* of 3 Pennyweights is 15

The *Decimal* of 5 Grains is 010416

oz. ———
19.160416

oz.	l. Dec.	oz. Dec. of an Ounce.
If 1 ———	2.9666 ———	19.160416
		2.9666



114962496
114962496
114962496
172443744
38320832

1.56.8412901056 *Decimal.*

I find it to be 56—16—10.

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